PALMER
TECHNIQUE
OF
CHIROPRACTIC

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A TEXT BOOK

on

THE PALMER TECHNIQUE OF CHIROPRACTIC

By

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First Edition

DEDICATION

On every subject, in every movement, with every progression, there must be a leader, but closely allied to him are always the several close and intimate help-mates from whom and about whom too little is known.

Chiropractic is no exception to that rule. Drs. Firth, Vedder and Burich are three of those men who have been close to me and mine for years. In the class-room; in my home, at my table and in Sunday conferences, we have threshed over the thousands of angles until our ideas have so mutually blended that they are as one.

When it came to getting out a book on this subject, I knew of no one set of men to whom I could entrust so much of its subject matter as these. And, as you review the work, realize with me, that I take very little of its credit. To them must go practically all of it.

As a pioneer, I perhaps thought a bit; but, as a finished product in the text-book for the student, to them must come all appreciation of that which you see and read.

To Drs. Firth, Vedder and Burich do I gladly dedicate this book. To those who have made it possible should go whatever credit and honor is due them.

PREFACE

Owing to a knowledge of the wide demand from the Chiropractic field in general for a work which covers in detail the Palmer technique of Chiropractic adjustments, the author has sought to supply that demand with the following authentic work. No effort has been spared by the author in making the book thorough, specific in detail and scientific in principle. Special care has been taken to provide ample illustrations whereby the student and practitioner may receive a vivid mental picture which will not be readily forgotten.

It is not expected that a knowledge of the practice of Chiropractic shall be gained from a perusal of the following pages, as the assistance of the competent instructor is vitally essential in the accomplishment of this end.

Because of his wide experience in training thousands of students in the technique of Chiropractic, Dr. Vedder has been selected to colaborate with the author on that section of the book which deals with the art of palpation and adjusting. This has been done because perhaps no other available man is qualified to offer the assistance as well as he. Every phase of the subject is thoroughly discussed and every method given is distinctly a part of the technique of Chiropractic as taught at the Palmer School of Chiropractic.

Dr. Burich has been selected to colaborate with the author on that section of the work which deals with nerve tracing and this because of his knowledge of the nervous system both from an anatomical and a clinical viewpoint. Dr. Burich holds a position in the Chiropractic world which is enjoyed by no other, as he is considered the final authority on matters pertaining to the nervous system.

Abnormalities in various forms have been the particular speciality of Dr. Firth for years and it is for this reason that he has been selected to collaborate on that section which deals

with unusual abnormalities of the spine. There is no other person as well qualified to discuss rotations, scolioses, kyphoses, lordoses, ankyloses, exostoses and other abnormalities of the spine in as intelligent a manner as is he. Therefore, it was to Dr. Firth that the author turned for the colaboration on this important section of the book.

Finally it can be safely stated that no trio of men could be selected to assist in the production of a work of this kind who would be more capable of seeing that it is authentic in every respect. The author believes that the experience of these men, together with his own vast experience, not only as a practitioner, but a teacher of Chiropractic since its origin, will establish this book as the official standard for the practice of Chiropractic for many years to come.

B. J. PALMER, D. C., Ph. C.

INTRODUCTION

The educational value of any compilation of ideas is vitally dependent upon the logical order and explanation of the subject matter. Therefore, that the student may acquire the greatest possible benefit from his diligent application, this book deals with the phases of the art of Chiropractic in a manner and order in which they are naturally grasped by the mind; thus causing a careful study to be conducive to real knowledge.

Chiropractic analysis is the determining of the abnormal expression of function, the manner in which function is abnormally expressed and the cause of this abnormal expression, and it is arrived at by vertebral palpation, nerve tracing and a knowledge of symptomatology.

The expert diagnostician, at the conclusion of an examination, names a disease from which, in his opinion, the patient is suffering. His knowledge, however, of the disease, is based not alone upon symptomatology and the application of its principles, but includes far more than this. He must be thoroughly acquainted in the beginning with the structure and location of the various parts of the body; further than that he must have a definite knowledge of the manner in which these various organs function, what the purpose of their functioning is and the ultimate end in the general metabolism of the body. This general knowledge makes it possible for him, together with the use of symptomatology to determine definitely what organ or organs are affected and the manner in which they are involved. The diagnosis is the superstructure which is placed upon the foundations of anatomy and physiology, but this superstructure could never exist were it not for the two latter phases. What anatomy and physiology are to the diagnostician in arriving at his conclusion, analysis is to the Chiropractor in the obtaining of results upon his patients. It is the

foundation, the base, upon which the entire superstructure of success is placed. One cannot be too forceful in presenting the idea of importance of analysis. Success depends absolutely upon results obtained; the results depend entirely upon the adjustment given and the correct adjustment depends absolutely upon arriving at the correct conclusion in making the analysis.

The term diagnosis with which we are all more or less familiar, is the conferring of a name upon a given pathological condition, and is arrived at by classifying the symptoms or manifestation of the diseased state. The diagnostician classifies his work into two phases; those of investigation and reason. In making his investigation, he first elicits the presence of subjective symptoms by questioning the patient; next he examines the patient, employing the various phases of physical diagnosis, namely, inspection, palpation, auscultation, percussion and mensuration. After having obtained all the functional and physical indications of incoördination he classifies them and from his knowledge of anatomy, physiology and the other primary branches of science, arrives at the conclusion that the diagnostic indications must result from a given specific pathological or diseased state. Having reached such a conclusion, he then confers a name upon it.

In contradistinction, the Chiropractor in making an analysis, upon finding the existence of a diseased condition, immediately arrives at the conclusion that there is an abnormal expression of function. By further application of reason, based upon a knowledge of the body and its functions, he determines what function is abnormally expressed and in what way it is abnormally expressed to produce the specific condition present. By further reason and further examination he determines the exact cause of this abnormal expression of function. In determining this etiology he employs two phases of physical examination, which are peculiar to Chiropractic alone; namely, vertebral palpation and nerve tracing, and it is only by having a thorough knowledge of these two methods that he is enabled

to locate accurately the causative condition necessarily existent in the spine. Thus it will be readily perceived that while diagnosis consists in a synthetic process, whereby the separate indications are brought together, classified and named, Chiropractic analysis is an analytic method wherein not only the symptoms are traced as indicating a given pathological condition, but the pathological condition is also analyzed as indicating the abnormal expression of function and by further analysis of the character of the pathological condition, it is determined what functions are abnormally expressed, and in what way. After having determined what functions are abnormally expressed, a further analytical process is followed which determines the etiological factors in the production of this abnormal expression.

Having determined the etiology of the effect, the Chiropractor employs a method distinctly his own which proves that his analysis is correct. This method is nerve tracing and by it the direct connection between the cause and effect is absolutely established. Thus it will be seen that nerve tracing is not only of inestimable educational value to the practitioner, in his field practice, but it is also one of the scientific features which differentiates Chiropractic from all other sciences.

The toggle recoil cannot be learned in a day. In order that the student might be assisted in acquiring the necessary skill whereby he may become master of the various positions, directions and angles of the adjustic moves, a system of drill which is amply illustrated, has been worked out and described. The student will find that by practicing these adjustic drills a few minutes each day, he will greatly improve his technique in adjusting, and become more proficient in the delivery of an adjustment. It should be thoroughly understood that the student should give close attention to detail in the position, angles, etc., demonstrated in the drills, as carelessness in practice is conducive to becoming a crude and unscientific practitioner.

Special attention has been given in section four, to the adjusting of curves of the spine and to other abnormalities which are the cause of considerable complexity to the average practitioner.

In conclusion, we may say that it has been our aim in the compiling of this work to produce something which has long been sought by the Chiropractic profession, something which will add to the Chiropractic equipment and something which will further assist in the standardizing of the practice of Chiropractic.

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SECTION I.

VERTEBRAL PALPATION

Palpation is the method of feeling, pressing or exploring with the fingers. Vertebral palpation is the application of the principles of palpation to the vertebral region; or it is a method of feeling, pressing upon or exploring the region over the vertebrae for the purpose of detecting irregularities or abnormalities in the form of subluxations, curvatures, etc.

The entire surface of the skin is studded with very small areas which are capable of receiving vibrations of different types. It was formerly supposed that all impressions received from the external thru the integument should be classed as touch sensations. Later investigators have, however, determined that there were various types of sensation received thru the medium of the skin and in general. They have classified these different types as the sense of touch, pressure, heat, cold, pain, itching and tickling. This, then, led to the further conclusion that only certain areas of the skin were responsive to sensations of heat; that only certain areas were responsive to the sensation of touch, cold, etc. Undoutedly there is placed beneath the touch spots a special end-organ of the sense of touch and the same would hold true of the cold spots, heat spots, pain spots, etc.

In some parts of the body the heat spots are very numerous while in other parts the cold spots are numerous and in still other areas the touch spots predominate. This variation in the different parts of the body and the comparative response to different types of sensation is a matter of common knowledge. For instance, the tip of the finger is an area where the true tactile sensation is much more acute than in other parts of the body, while it is not nearly so sensitive to variations in the temperature as is the cheek or the arm. It is also in the tips of the fingers

that the sense of pressure is very acute and this, together with its sensitiveness to touch, renders it the most logical part of the hand for the Chiropractor to use in making his palpation.

The different varieties of sensation are the result of action upon different end-organs and it is generally conceded by investigators that the impressions are conveyed over the afferent nerves to the brain, thru different bundles of nerve fibers. Where hairs are present the touch spots are found in minute nerve plexus, usually on the windward side of the hair. In those parts of the body where hairs are absent the corpuscles of Meissner act as the tactile end-organs. To show the distinction in the different parts of the hand there are, on an average, from two to eight corpuscles of Meissner to each square centimeter on the palmar surface of the hand and fingers, while there are approximately twenty-one of these end-organs per square centimeter on the tips of the fingers.

It is with the sensations of touch and pressure that the Chiropractor has the most to do in vertebral palpation. He is not only called upon to sense alterations in the contour of the surface over which his fingers are gliding, but he is also called upon to make a mental note of the different degrees of pressure to which his fingers are subjected in passing over different points in a group. For example, if one is palpating over the tips of the spinous processes with the tips of his fingers, he is aware of an increasing pressure as he passes each spinous process while he is also aware of a decrease in pressure as he passes those spaces found between the tips of the processes. This same fact is noted in palpating along the lateral margin of the spinous processes, and all of the information must be carefully stored in his mind and a general comparison made of the different tactile sensations as he passes over different parts of the spine.

Cold spots are much more numerous than are heat spots, being found in the proportion of about ten to one. Heat spots, however, are more numerous in some parts of the body than in others. For instance, they are found more widely distributed on the dorsal surface of the hand than on the palmar surface.

It is for this reason that the Chiropractor uses the dorsal surface of the hand in passing over the spine for the location of hot-boxes.

Vertebral palpation, as made by the Chiropractor, involves a definite method, which method includes the technique of vertebral palpation. Every phase of this technique will be carefully considered in the following pages, but before this is done, we will turn our attention to those factors which must necessarily precede the actual palpation.

PREPARATION OF PATIENT

It is essential that the patient be thoroughly prepared before the practitioner begins to make his analysis and this preparation includes several features. The clothing should be so arranged that the spine is entirely exposed, no wearing apparel of any kind being left between the skin covering the spine of the patient, and the fingers of the palpator. The palpator should be careful in noting that the waist band is loosened allowing free access to the lower lumbar vertebrae, the sacrum, ilii and coccyx. Sometimes we observe carelessness in having the garments so prepared that difficulty is experienced in passing bands or strings which are stretched across the spine. This is not only a hindrance to accurate counting of the vertebrae, but it is also a very distinct handicap in making a comparison of the segments of the spine in this particular region. If a comparison is so made the string is either in contact with the first or third fingers and the impression thus gained serves to confuse the palpator. Every effort should be made to concentrate the entire attention on the reception and interpretation of the impressions received and this cannot be done with the greatest efficiency, if the mind of the palpator is more or less confused with other impressions which have no direct bearing upon the condition of the spine.

While it might not appeal to some practitioners as an essential feature, it is, nevertheless, of extreme importance to have no clothing covering the spine when a palpation is made. This because of the fact that it is only by direct contact with the spine

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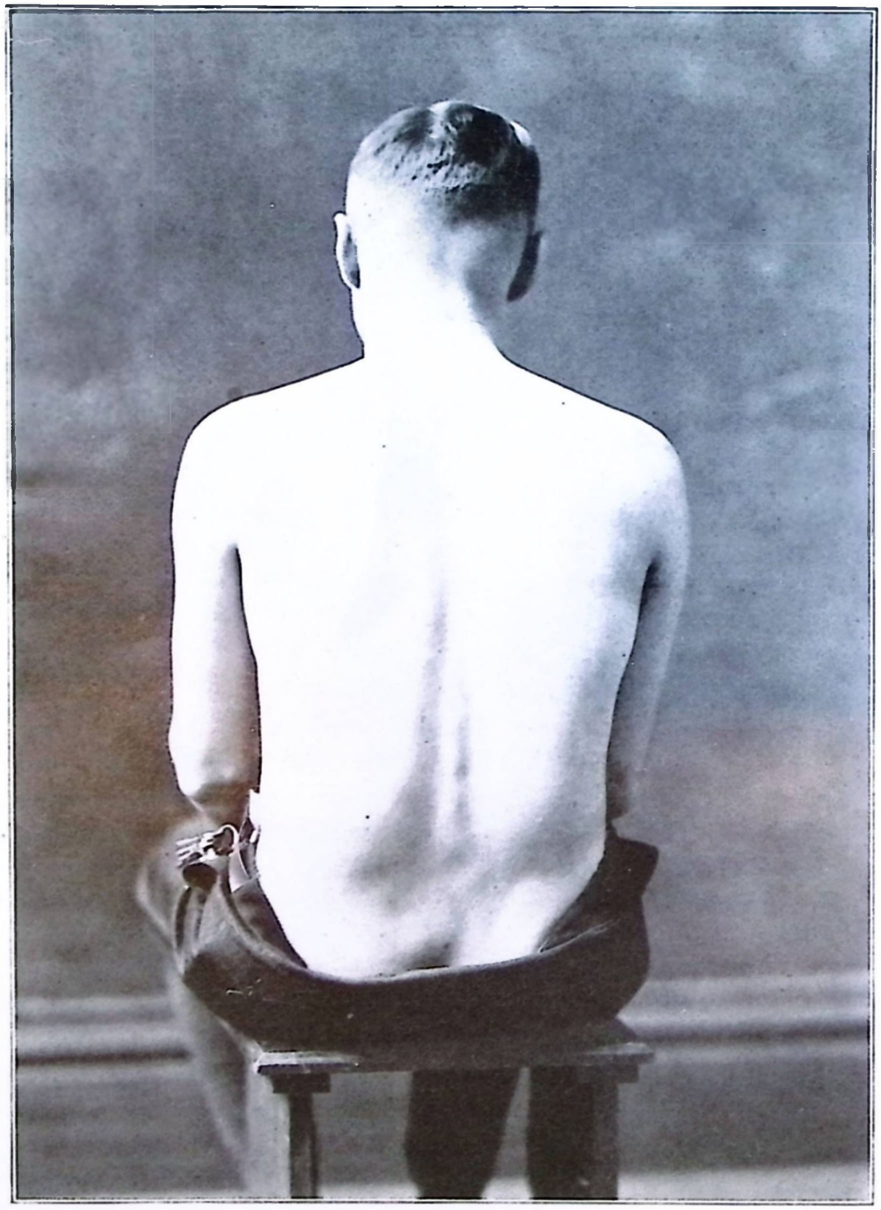

Showing Proper Preparation of Patient for Vertebral Palpation

of the patient that we may gain the most accurate knowledge as to the existence there of abnormalities. Especially is this true if the abnormalities are of such a slight character that they are difficult to detect. Many acute and severe conditions are produced by very slight subluxations which might easily be overlooked except for the close attention to detail. Considering the great importance of accuracy in palpation, no detail should be neglected which will make the subluxations easier to determine. We realize that there are some Chiropractors who examine their patients thru the clothing, but if this is done it is due either to ignorance on the part of the palpator or to unjustifiable carelessness in his technique.

For palpation, the patient should be seated upon a flat-topped stool without a back, and from fourteen to sixteen inches in height. A position should be assumed which is comfortable and natural, both feet being placed flatly upon the floor and both hands resting in an "easy" position in the lap. The head should be held erect, except in cervical palpation when it is inclined slightly forward, the forehead resting in the palm of the palpator's free hand. The patient should be impressed with the importance of not assuming a stiff or unnatural position but should be instructed to sit in an easy position in order to assist the palpator as far as possible in making an accurate palpation.

It is a very easy matter for the patient, by assuming an incorrect position, to lead the palpator to an inaccurate conclusion. For instance, one of the most common mistakes is for the patient to allow one hand to rest, in a relaxed condition in the lap, while the other hand is placed upon the hip or thigh. This necessarily throws the one shoulder higher than the other and in order for the patient to maintain his balance, the spine is curved in the dorsal region toward the side of the raised shoulder. Another very common mistake is in the crossing of one leg over the other. If the right leg is crossed over the left, it naturally raises the right ilium to a higher level than the left and tilts the sacrum. Thus the very foundation of our spine is thrown out of alignment and as a compensation, a curve is produced laterally in the lumbar and lower dorsal regions toward

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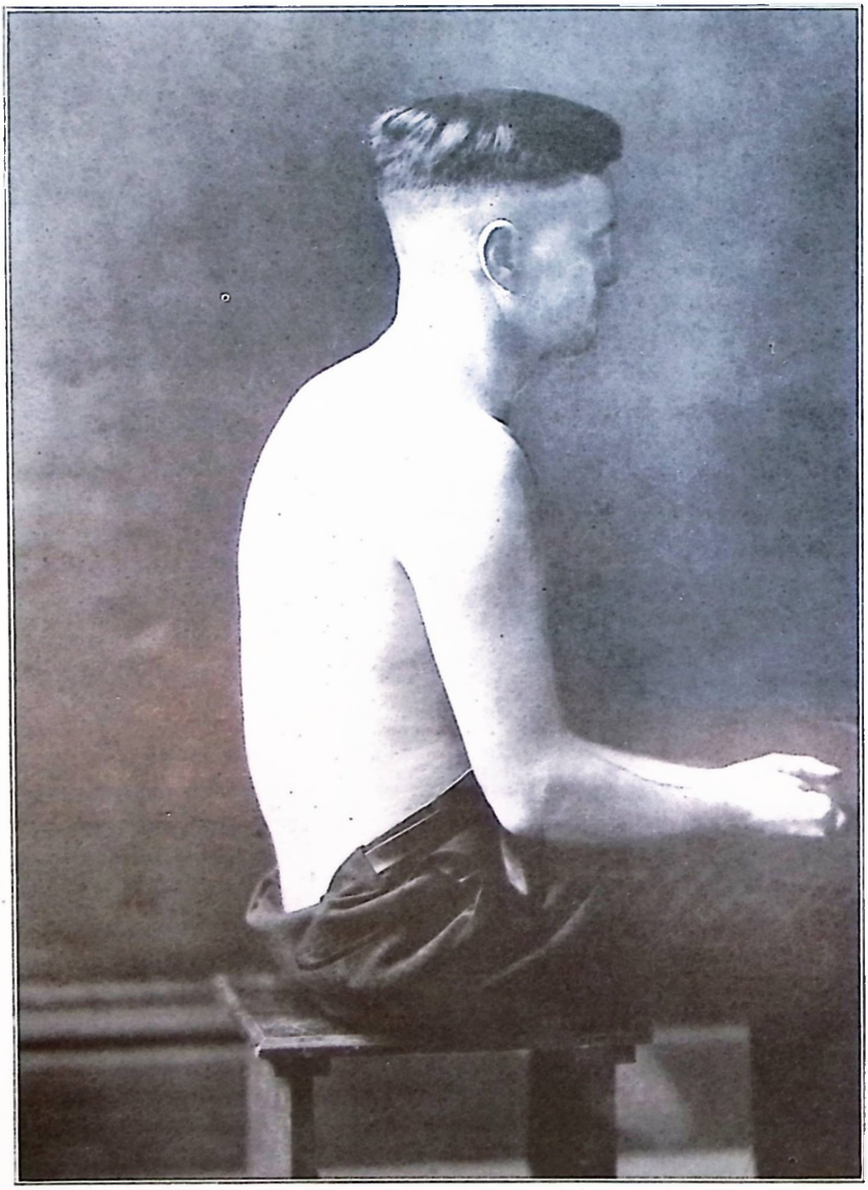

Showing Proper Posture for the Patient to Assume for Palpation

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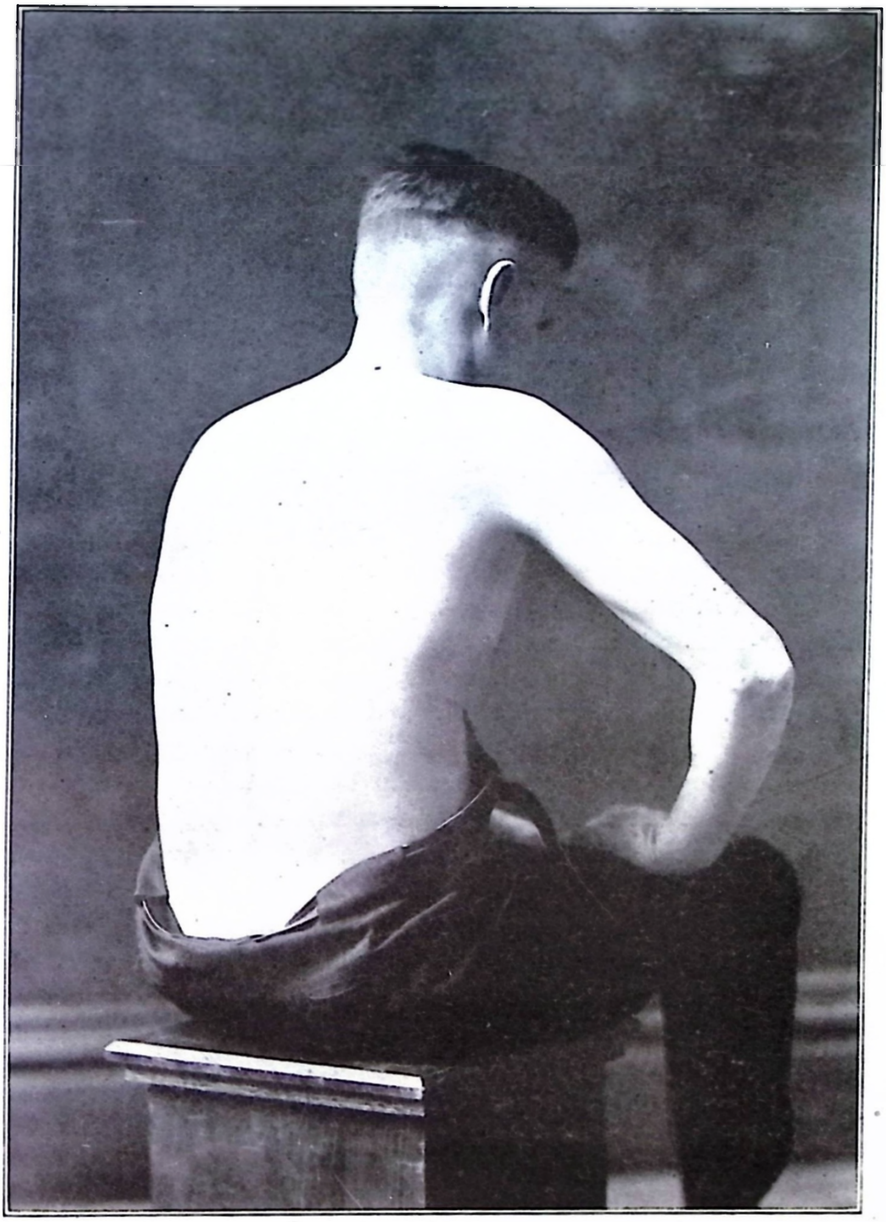

Showing Improper Posture of Patient for Making Palpation

the side of the lower hip. Another mistake that is sometimes made, altho not as common as the two mentioned above, is that of the patient bending forward at the waist. When this is done the secondary curve in the lumbar region is eliminated and the primary curve in the dorsal region is materially reduced. When any of these conditions occur, the relative positions of adjacent vertebrae are altered and subluxations which are very apparent when the patient assumes the normal position, cannot be detected. Therefore, when so much depends upon an accurate palpation being made, every care should be taken to see that the patient's spine is the same when he is palpated as in his ordinary occupation. The above suggestions are recommended for use in palpating those patients who are not crippled or deformed to any great degree.

People suffering from any deformity, more especially a deformity of the spine, should be allowed to assume a position which is to them natural and easy. In these cases if the above directions are not followed explicitly, the palpator may be misled in regard to the true condition existent in the spine of such a patient. It must be remembered that the subluxations to be adjusted are those which are indicated by the symptoms, by nerve tracing and by palpation to be the most marked. In case of a patient possessing a curvature of any kind, if he is made to sit as erect as possible, the palpator is not able to get an accurate knowledge of the relative positions of the vertebrae under ordinary conditions. This, because of the fact that as the curve is somewhat straightened, the vertebrae lose in some degree, their former relationship. In any curvature of the dorsal region, the ribs have naturally assumed an abnormal position to accommodate themselves to their vertebral attachments and it might be assumed that the ribs would force the vertebrae to retain their former positions, but it must be remembered that these flat bones are slightly movable on the vertebrae and that they are also slightly elastic, thus permitting of greater alteration in the dorsal region than might at first be assumed.

In those patients who suffer from any condition which produces a stiffness of the knee or hip on one side, care should be taken to see that the other member is placed in a position as nearly like its fellow as is practical.

Under no circumstances should a conclusion in palpation be arrived at while the patient is lying on the adjusting table. This for the reason that at that time he is suspended between the hips and the shoulders, the relationship between the adjacent vertebrae is thus partly lost, due to the altered contour of the spine. Practically every Chiropractor has had the experience of finding a vertebra subluxated in a certain direction when the patient is in the proper position for palpation, but upon placing him on the adjusting table and locating the vertebra, his palpation discloses a subluxation in the very opposite direction. This is true because of peculiarities in the shapes of certain vertebrae and the different degress of tension which are placed upon them by muscles and ligaments called into play when the prone position is assumed.

In bedside work it is never advisable to palpate the patient in the horizontal position if it is at all possible to have him assume the upright position. There is just as great a possibility for error if the patient lies in the prone position in bed, as though he were suspended between the adjusting tables. In some cases there is even greater probability of error because of irregularities in the surface upon which he is lying and because of the fact that beds very often sag in the center and the patient is therefore forced to lie upon a surface which is not level.

It is almost as unsatisfactory to have the patient sit up in bed with the limbs stretched straight in front of him. In this position he is forced to lean forward and this partly eliminates the secondary curve in the lumbar region and reduces the primary curve in the dorsal region.

It is also essential that the palpator be provided with a palpation stool of the proper height and with a flat top. The palpation should not be made on a chair because the surface

is seldom flat and the slight irregularities permit one hip to be raised slightly above the other. It is for this same reason that a padded palpation stool is not, as a rule, as satisfactory as a hard surfaced stool. This because of the danger of the padding being somewhat variable in different parts of the surface.

Finally we may say that the palpator should exercise extreme care to see that his free hand does not press upon the patient's shoulder in any material degree. If this is done, the patient unconsciously is forced to assume a leaning position or to contract the muscles on one side to avoid being pushed out of the erect position. In either of these cases, the vertebrae may be altered and thus the palpator be led to an improper conclusion.

PREPARATION OF PALPATOR

While it is essential that the patient be properly prepared and seated to be palpated, it is none the less important that the palpator himself take as great care in his preparation before the process of palpation is begun. He must look to various phases of attire and toilet. It is assumed that the Chiropractor is well aware of the importance of personal cleanliness and nothing need be said on that score. However, there are some features of the attire which will bear special attention.

A sleeve should be worn which will not in any way bind upon the arm and thus cause a pressure upon the nerves leading from the finger tips to the brain, thereby interfering with the normal transmission of the impulses or with the free movements of the arm. The jacket which is worn should be large and roomy so that the palpator may stoop forward without undue discomfort, to palpate the lower regions of the spine.

Since the Chiropractor's work is done entirely with the hands, it is important that they be kept soft and in a condition whereby they will be able to produce the best possible results in palpation. Generally speaking, the end-organs which

are concerned in receiving sensations of pressure, are deeply placed. It is therefore necessary for the vibrations from the external object. to compress the skin and the underlying tissues before the end-organs are actually affected. If the skin, over the tips of the fingers is thickened and hard, there is greater difficulty in the vibrations being transmitted to the underlying pressure end-organs because of the resistance offered by the skin. On the other hand, if the skin is soft and pliable, and if the underlying tissues are correspondingly soft, the external vibrations reach the end-organs much more readily and the palpator is thereby enabled to detect variations in pressure of a slighter degree than would otherwise be possible.

Not only is the condition of the skin over the tips of the fingers of utmost importance, but special care should be given to keeping the nails properly manicured. The free margin should be trimmed and kept short at all times, so that the palpator may use the very tips of the fingers in his technical work without, in the least, scratching the surface of the skin on that spine which he is palpating.

There are some individuals in whom the fingernails extend further out on the tips of the fingers than in others, but in all cases, the nails should be kept short so that the palpator can use the very tips of the fingers where the sensation is most keen without bringing the nails in contact with the patient's flesh.

The palpator should stand facing the patient on either the right or the left side and at a point opposite to the front of the stool upon which the patient is sitting. When standing upon the right side of the patient, the left hand is used as the palpating hand. The right hand, which is free, is placed either upon the forehead of the patient or upon the shoulder nearest the palpator. If a palpation is being made of the cervical region, the palpator should have the patient incline his head slightly forward, resting the forehead in the palpator's palm as a support. This support is for the purpose of allowing the patient to relax the muscles of the neck thor-

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Correct Position for Palpating Cervical Vertebrae

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Correct Position for Palpating Dorsal Vertebrae

oughly, and thus make it easier to locate and determine the direction of the cervical vertebrae. In the dorsal, lumbar, sacral or coccygeal regions, or upon either of the ilii, the palpator's free hand should be placed upon the shoulder of the patient so that he may be kept in a natural position and further, that the palpator may keep the relation between his body and that of his subject the same at all times. This is of extreme importance in order that the position of the palpator shall always be the same on all of his patients. Experience shows that one who is accustomed to palpating the spine in a certain position is easily led astray if he assumes some other position. This method serves to develop a certain definite relationship between the position of the palpator and that of the patient at all times.

If the palpator is standing upon the left side of the patient the right hand becomes the palpating hand and in this position the same technique applies to the left hand as was designated for the right hand in the foregoing description.

In the cervical region, when the free hand is placed upon the forehead of the patient, care should also be taken that the head is not turned to one side or the other. If this should occur it would lead to the impression that there is a rotation or some abnormal condition in this region and thus the palpator would be led astray on his finding.

In their anxiety to develop a keen sense of touch, beginners are sometimes led into the unwise practice of trying to make the tips of the fingers more sensitive by palpating rough, hard objects. This is, as a matter of fact, one of the worst methods of procedure that could be followed. Instead of developing a more acute tactile sense, the skin on the tips of the fingers is made hard, thick and rough. With this condition existing, it is much more difficult to affect the touch corpuscles and pressure corpuscles in the deep structures of the skin, than as if the integument were soft and pliable. Under no circumstances should the beginner palpate hard, rough surfaces even with a light touch. If any method is

used to develop sensitiveness of the finger tips, it should be by palpating some surface of the body, where the finger tips are in actual contact with flesh, rather than with some substance which does not even remotely resemble the skin.

GENERAL CONSIDERATIONS TO BE OBSERVED IN PALPATING

Concentration. The greatest accomplishment of the mind is the power to so draw together and apply its thoughts and activities upon a specific idea at a definite time, employing each and every mental faculty upon the subject in hand, that the product of these mental activities will be of the clearest and most vivid character possible.

The expert in any line of endeavor is truly the expert because he is the master of detail. To be the master of detail, he must, as a necessity, be one who has control of his mentality to such an extent that he is able to place it at a task of solving the intricate phases of those details, and comprehend them to the fullest extent. He is that man who has the absolute mastery of his mind, concentrating it on the subject in hand to such an extent that surrounding conditions do not, in the least, interfere with his mental faculties. His is the master mind, the mind which, of necessity, becomes the controlling force over many minds of less power of concentration. Are you a master mind? If not, you must learn the first great lesson of vertebral palpation, which is concentration.

It is a well-known fact that one of the secrets of concentration is interest in the subject. At first the act of palpation is a more or less mechanical one and more or less the student approaches the subject with no particular interest, so far as the subject itself is concerned. Whatever interest he does manifest is the result of his desire to gain such a degree of proficiency that he may be enabled to deliver the very best service to his patient. At this time he is not taking an interest in the particular spine upon which he is working. Gradually, however, as he delves deeper and deeper into the subject, he

discovers unusual features in this case, conditions about which he has never been informed in another case. Thus he begins to acquire a general knowledge of abnormal conditions and in palpating a patient he recalls either consciously or unconsciously other spines which he has palpated in the past, and makes a mental comparison.

Memory is a function of the mind which serves to impress certain facts so that they may be recalled at will. People have no difficulty in remembering those experiences of joy, suffering or other passions which impress themselves vividly on the mind. Other ordinary impressions, however, are not so easily remembered because they do not produce the same effects. In these cases the attention must be bought into play in order to impress the facts upon the memory so that at a later period they may be recalled. Attention is a phase of the will and to give absolute attention to a single phase of thought to the exclusion of all other ideas requires a distinct effort of the will.

Therefore, will power becomes an essential factor in the riveting of the attention of the palpator upon the subject in hand to such a degree that he can recall mental pictures of this and other cases. This ability to rivet the attention can be developed to a marked degree. At first, it is very difficult but, like breaking a bad habit, it becomes easier each time that we force the attention to the matter in hand by an effort of the will.

It has been said that attention is the die that stamps a deep impression on the memory. This becomes an essential factor in palpation because, in the consideration of any group of vertebrae for the purpose of comparison, it is necessary to make a mental picture from the impressions which have been gained. This mental picture is the composite result of the impressions received in palpating the vertebrae over the posterior surfaces of their pits, and on each side. When this is done, the palpator recalls the impression which has been left by each particular vertebra and makes a mental comparison

of that vertebra and those immediately above and below it. All of this, however, is in turn, compared with his mental picture of a normal spine and the positions which the vertebrae should assume if they were normal.

From the foregoing it can be seen that the mere act of palpation, no matter how often repeated, does not, in itself tend to promote accuracy or perfection. It must, of necessity, be accompanied by a state of mind which is open to the reception and interpretation of all impressions which may be derived by means of the end organs of the sense of touch. There are a certain definite number of tactile end organs placed in the tips of the fingers and whether an individual palpates a day or a lifetime, this number will not be increased or decreased; neither will the nerves which carry the afferent impulses of sensation to the brain undergo any histological or physiological change which will render them more capable in the performing of their function. It is only the process of the interpretation of impressions which can be improved and this can only be accomplished by the strict adherence to the principles of concentration or unity of thought. One had better palpate for fifteen minutes each day and absolutely concentrate his attention during that period, upon the subject in hand, than to palpate several hours a day and allow his mind to wander and dwell upon extraneous subjects.

Conversation with the patient must necessarily be suspended temporarily in order that an accurate mental picture may be obtained of the spine and its various subluxations. Not only should conversation be eliminated for the time being, but any other action which would tend to disengage the mind of the palpator should be omitted.

POSITION OF FINGERS

The position in which the fingers of the palpating hand should be held is such as to offer them the greatest advantage in gliding over the spine to compare the vertebrae of various groups. The first, second and third fingers are held together

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Showing Correct Position for Palpating Hand and Finger

with their tips on a given plane. The three fingers are gently curved at an angle of about 90 degrees, so that the forearm may be held in a plane parallel with the back of the patient. At the same time, the thumb and little finger should be held away from the surface of the back so that impressions will not be produced which will interfere with the interpretation of those derived from the three palpating fingers.

The necessity of keeping all parts of the hand and fingers off from the back cannot be too strongly emphasized. In a matter of this kind where the accurate interpretation of the impressions received is of utmost importance, there should be no vibrations set up, either in the tip of the little finger or on the skin covering the thumb. If such vibrations do occur, they lead to more or less confusion in the mind of the palpator as to the actual impressions received thru the tips of the three palpating fingers.

The idea of holding the three fingers together at the tips is in order that they shall not change their position relative to one another after the three tips are in contact with the back. If this should occur the sensation of pressure in the different parts of the spine could not be relied upon, as that difference might be the result of the changed position of the three fingers. In brief, it may be stated that these three fingers held so that their tips form a straight line, act as a straight edge, and when they glide over the spinous processes they record even minute irregularities which otherwise could not be determined.

Care should be taken to see that the fingers are properly flexed, because if they are held too straight it is very hard to make the tips form a straight line. This is for the reason that the second finger is longer than the other two and would naturally project out so that the tips could not rest on the same plane.

It is immaterial whether the thumb and little finger are in contact with the first and third fingers or not. They may be held in contact providing they are kept entirely off from the surface of the back. Again, they may be held out from

the three palpating fingers so that they are entirely free from any contact.

POSITION OF THE ARM AND HAND

The position of the hand is largely designated by the position of the fingers which has been described in the foregoing lines, but we may say further that the dorsum of the hand should be in a plane as nearly as possible with the posterior surface of the forearm. Thus the wrist is held straight and is not arched forward nor backward. In regard to the wrist it may be said that there should be practically no angle either of adduction or abduction, so that the wrist is at all times in a free and easy position.

The forearm should be held at such an angle that its axis will form an angle of 90 degrees with the spine of the patient. In other words, the elbow should be held at the same height as the wrist at all times and the body of the palpator should change its position to make this possible. There are two distinct advantages to this technique, viz: the three palpating fingers are allowed to bear the same relation in one part of the spine as they bear in every other part, thereby enabling the palpator to receive impressions under similar conditions at all times. It also avoids all possibility of cramping the wrist by forcing it to assume an unnatural and uncomfortable position. This might, in itself, result in the abnormal interpretation of impressions received, hence an improper listing of the vertebral subluxations.

Probably the most common error in the position of the hand is that of permitting the heel to drag on the patient's back or on whatever clothing may be found at the side of the spine. This serves to more or less detract the attention of the palpator and produce confusion in the impressions he receives from the tips of the fingers. It must be remembered that the impressions received must all be corelated in the mind and a comparison made before an accurate sensation can result. If only impressions are received from the tips of the fingers

Cut 7

Showing Correct Position of Hand and Forearm in Palpating the Dorsal Region

there is no possibility of confusion, while if impressions are being received at the same time from the nerve endings on the heel of the hand, the same degree of accuracy cannot be hoped for.

Here is an example of the value of loose fitting garments not only across the shoulders but also at the elbows: If the garment is tight across the shoulders it tends to bind in the axillary region when the palpator stoops forward, and this hinders, in some degree, the free transmission of impulses along the afferent nerves to the brain. The same thing is true if the sleeves bind the palpator's arms at the elbow.

Another common source of error is the failure of the palpator to stoop forward as he progresses down the spine. This he must do in order to keep the elbow always at the same level as the palpating fingers. The tendency, however, is to lean only slightly forward and thus more or less cramping of the wrist results. Sometimes the palpator will find this difficult of accomplishment, but when this is true it will be found that he is assuming an incorrect standing position in relation to his patient.

GLIDING MOVEMENT

The palpation of the spine should always be made from above downward and with a gliding movement over that region which is being explored. Should an individual hold a single vertebra in his hand in any position he would not be able to determine whether it was subluxated to the posterior, right, left, superior or inferior. This for the reason that there would be nothing with which he might compare it and upon which he might base his conclusion. Neither would it be possible for him, by palpating but one vertebra in the spine, to determine whether that particular segment was subluxated in any of the aforementioned directions. This for the reason that the determining of a subluxation and its directions is accomplished by comparing the existent position with the mental conception of what it should be normally. The student

Cut 8

Showing Correct Position of Hand and Forearm in Palpating Lumbar Region

gains this knowledge as to the relative position of the vertebra in question by comparing it with a group of vertebrae directly adjacent to it above and below. This can best be done by a fairly rapid gliding movement over the various parts of this group, comparing the position of the vertebra in question with the positions of those immediately above and below it. The movement should be even and gliding rather than jerky, for the reason that the mind is prone to exaggerate the last impression received. By gliding rapidly over the entire group an idea is gained as to what segment in that group shows the greatest degree of displacement.

The necessity for a fairly rapid glide can be illustrated in the following manner: Place the three fingers in the correct palpating position and palpate very slowly over the back of the hand and arm. If this movement is made extremely slow, it will be difficult to determine a slight angle between the forearm and hand. On the other hand if the glide is made rapidly one is distinctly aware of the fact that he is passing from one plane to another.

This gliding movement should always be from above downward and if the proper hand is being employed in making the palpation, it will be found that the third finger always leads the group. It should be kept constantly in mind that at least five vertebrae should be included in every group considered.

Palpators are very apt to make the mistake of comparing the vertebra in question with only the one directly above and that directly below. This is inaccurate because the vertebra above may be subluxated as well as the one below and when this is true the palpator will be led to an incorrect conclusion. For instance, we will suppose that we are determining the position of a sixth dorsal vertebra. We will assume also that in this particular case, both the fifth and the seventh dorsal vertebrae are subluxated to the right. If we make our comparison only with the fifth and the seventh we will gain the impression that the sixth is subluxated to the left even though

it may be, as a matter of fact, in its normal position. As this is true of laterality, it is also true of superiority and inferiority. We will suppose that the fifth dorsal vertebra is superior and that the seventh dorsal vertebra is also superior. We will assume further that the sixth dorsal vertebra is in its normal position. If now we palpate only these three vertebrae, we will find that the space between the fifth and sixth is comparatively large, while that between the sixth and seventh is comparatively small. Naturally our conclusion would be that the sixth dorsal vertebra was subluxated to the superior when, as a matter of fact, this is not true.

In either of the above supposed cases we could, by having palpated several above and several below the one in question, have determined that the fifth and seventh dorsal vertebrae were the ones subluxated. In the first case, we would have readily found that, by comparing the fifth with the third and fourth, as well as the sixth, that it was subluxated to the right. Likewise we would have found, by palpating the sixth, seventh, eighth and ninth dorsal vertebrae, that the seventh was subluxated to the right. In the second case, we would have determined that the space between the fourth and fifth was too small and that the space between the seventh and eighth was too large. This in conjunction with the large space between the fifth and sixth and the small space between the sixth and seventh would have inevitably led us to the correct conclusion that the fifth and seventh vertebrae were both subluxated to the superior.

One of the most common errors in palpating is that of gliding down as far as the vertebra in question and then moving the fingers from side to side in the effort to determine laterality. This is not only a poor method to get a comparison with the several vertebrae above and below but it is not accurate even in comparing with one vertebra above and one below. This for the reason that the straight edge formed by the three fingers is not long enough in the majority of cases to cover the tips of three spinous processes. If the tips of the

fingers are held together the first finger only reaches the lower border of the superior vertebra while the third finger only reaches the upper border of the lower vertebra. Again, if the fingers are spread sufficiently to cover all three spinous processes there is no accurate basis for comparisons for our straight edge is thereby lost.

Sometimes the error is made of gliding upward on the spine rather than downward. This is not a good habit because if the palpator always glides downward he receives the impression in a certain definite sequence and learns to interpret them in that order. If now, he attempts to glide upward he is receiving the impressions in the reverse sequence and this naturally tends to produce confusion.

Another common mistake is that of hesitating with the second finger on the tip of each vertebra palpated. This method would be all right if counting were the only factor to be considered. However, when the object to be obtained is the comparison of the several vertebrae in a group with one another a rapid glide must be maintained in order to get the general group idea.

Sometimes it is permissable for the palpator to stop with the tips of the three fingers spread apart and each resting on the tip of a vertebra. Then have the patient lean well forward and straighten up, alternating these movements for several times. This, however, is not in reality done for the purpose of determining the positions of the vertebrae, but rather to gain knowledge of any fixation which might result from ankylosis or exostosis.

By the constant gliding movement from above downward, a certain set of touch corpusceles is constantly in use which make them more susceptible to this particular kind of stimulation than if a great number are involved in divers ways. The gliding movement should always be employed in the palpation of the entire spine with the exception of the atlas, sacrum, coccyx and ilii.

Cut 9

Improper Method of Determining Superiority and Inferiority

LIGHT TOUCH IN PALPATION

If there is one thing more important than another in the process of palpation it is that the palpator use the utmost care in avoiding all undue pressure upon the spine of the patient.

The pressure used should be as light as is consistent in producing the required amount of stimulation in the touch corpuscles. This should be done for four reasons.

First, a heavy pressure tends to deaden the sensibility of the touch corpuscles and make them less susceptible to the vibrations, thus preventing the palpator from obtaining the desired information. This is proven by the fact that all people who are blind and who are conceded to have the keenest possible sensation in the fingers, use a very light and delicate touch in the examination of all objects. It is further proven, by physiological experiments which show that excessive stimulation always produces a perverted sensation. A wide experience in observing thousands of palpators and noting the results of their work has led to the inevitable conclusion that the palpator who uses the light pressure upon the spine obtains far more accurate results than the one who uses a heavy pressure. Given a palpator who is extremely accurate in his work and you will find that he invariably uses a light touch. This is not true in 90 per cent of cases but it is absolutely true in every case.

Second, when too great a pressure is produced, the individual receives impressions from the vertebrae but also receives minor impressions from the soft tissues adjacent to them. These impressions are conflicting and lead to the confusion of ideas.

Third, a heavy pressure is not only unpleasant and often painful to the patient, but also gives him the idea that the palpator is going about his work in a crude and awkward manner. On the other hand should a light touch be used, the patient is favorably impressed and assumes that the palpator

is an adept, performing his work in a truly scientific manner.

Fourth, in patients suffering from nervous disorders, heavy pressure is often the exciting agent in the production of a headache, syncope, palpitation, nervous chills and other symptoms of their incoördinations.

PALPATION DRILLS

It should be the highest aim of the palpator during his apprenticeship in palpation to develop a keen sense of touch, thereby enabling him to do more proficient work upon his future patients. To promote the accomplishment of this purpose, a system of palpation drills has been devised, in which by diligent application and due concentration the student acquires the desired keeness of sensation. This greatly assists him in doing reasonably good work upon the spine even from the beginning. These drills are simple and apparently of little consequence, but it has been amply demonstrated that their real value to the beginner is inestimable.

Palpation Drill No. 1.—The arm should be bared to the elbow, and extended forward at such an angle as will permit of comfort and ease in gliding the first three fingers of the opposite hand, placed in the proper palpating position, along the surface of the bared arm. This movement should always be of a gliding character, with the little finger of the palpating hand leading. Various surfaces may be palpated by changing the position of the bared arm, and these positions may be changed at the will of the student. After having palpated for a few moments with one hand, a change should be made and the opposite arm bared and palpated. The student should ever bear in mind that the benefits derived from this practice in palpation depend entirely upon the degree of concentration and attention that is given to the various sensations produced as the fingers glide over the underlying structures. These underlying structures are of different characters and naturally give rise to different impressions. For instance, muscles give rise to irregularities and the same is true of veins, tendons and

Cut 10

Palpating the Arm to Develop the Sense of Touch

Cut 11

Palpating the Hand to Develop the Sense of Touch

bones. Each of these structures, however, gives a different character of sensation and this difference should be carefully noted by the student because in the palpation of the spine, he will find many slight irregularities which are not due to the presence of the abnormal osseous structures or to mal-positions of the vertebrae. Rather, they are the result of cicatrices in the connective tissue below the skin or in the skin itself, or perhaps they may result from undue contraction in muscle bundles which have their attachment near the spine. In brief, the student should keep continually in mind the fact that he is training his mind by practice to concentrate upon detail. He should remember that whatever improvement he makes is the result of developing his ability to properly interpret the impressions received, and not to any alteration at the tips of the fingers.

Palpation Drill No. 2. After a few minutes practice upon the bared arm, it is well to vary the drill so that it will not become monotonous to the mind, and as a result lessen the degree of concentration. In this drill one hand may be closed, thus drawing the skin tightly over the dorsum and the fore-arm flexed and pronated, so that the knuckles extend in a line either at right angles or parallel to the sternum. The opposite hand should then be employed as palpating hand held in the characteristic position with the tips of the three fingers gliding over the knuckles and dorsum of the closed hand. This variation of the drills is valuable in that it accustoms the student to receiving and interpreting different kinds of sensation. This is essential because he meets with different kinds of facts. In some, the spines are covered with a heavy layer of flesh while in others the spinous processes project so prominently that the vertebral subluxations are plainly visible.

It is not always the spine which is covered with the most flesh that is the hardest to palpate. The relative difficulty is due in part to the thickness of the flesh over the tips of the spinous processes but it is also due in part to the degree of tone in those muscles. Sometimes one will palpate the spine

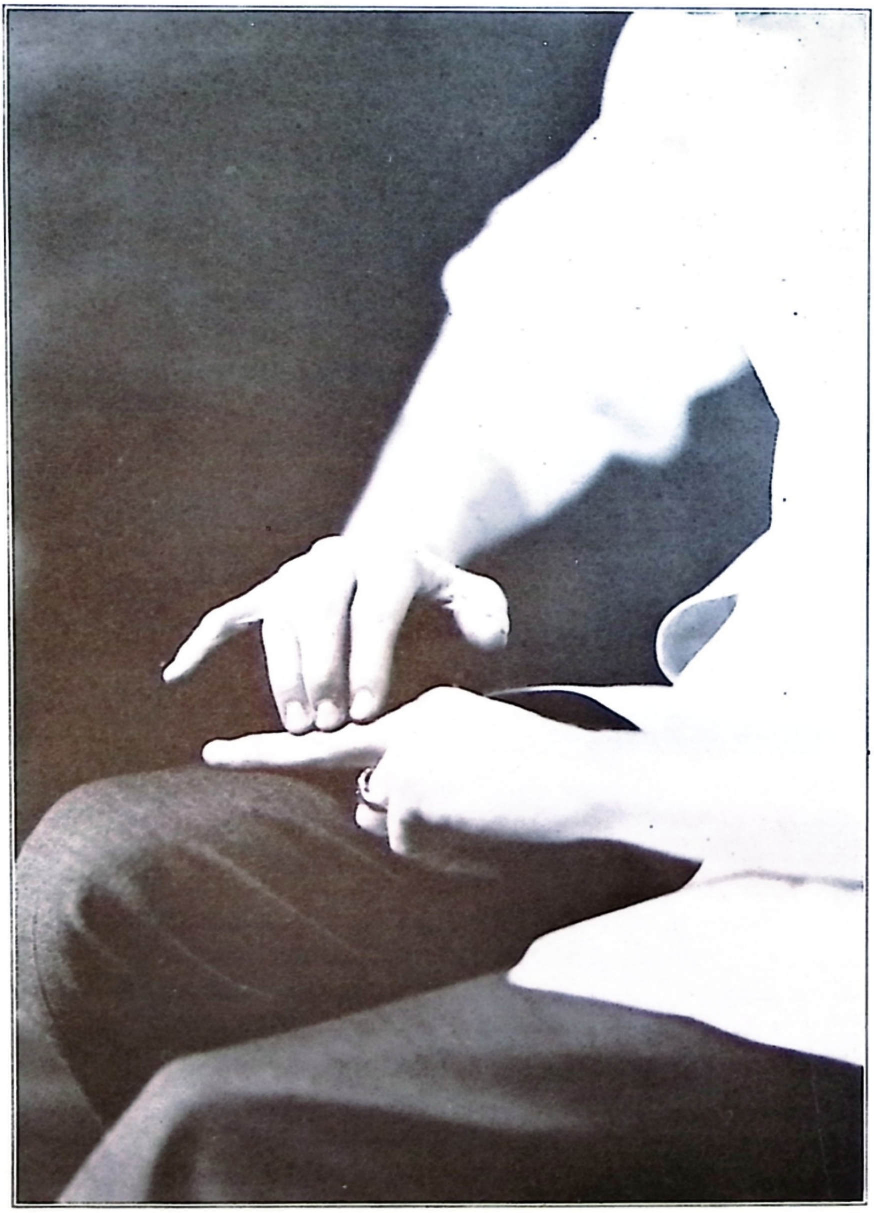
wherein the muscles throughout the entire body are more or less in a state of high contraction. These are the most difficult cases to palpate and extreme care must be taken not to confuse the irregularities of the muscles with the irregularity of the spine which the palpator is seeking to determine. Because of this variation in the condition of the muscle tissue in different individuals it is desirable, in all the palpation drills, to palpate the tissues a part of the time while they are in a state of contraction and a part of the time while they are relaxed. In this way one may accomplish two things. He learns to determine by the touch whether or not the muscles over the spine possess the normal tone and he is also able to distinguish the difference between a contracted muscle and the other underlying tissues.

This drill should be altered frequently, changing the palpating hand for that to be palpated. In this way the sense of touch is developed in both hands equally. This is an essential factor because the touch centers in the brain where the nerve fibers from the palpating fingers of the right hand terminate, are not the same as those where the fibers from the left hand terminate. Each of these centers must be used in the palpation drills in order to develop them equally. This is for two reasons. First, it is often necessary to get a palpation in the dorsal region by first palpating with one hand and then with the other, because by using one hand entirely, the palpator is very apt to misjudge the direction. On the other hand, if he palpates first with one member and then steps to the other side of his patient and palpates with the other hand, he is able to give a comparative estimate of the position of the vertebra more accurately.

Also in the palpation of the atlas, it is necessary to employ both hands and in doing so the relative importance of the sensations received from each hand should be founded on the same basis. This cannot be done if one side is more susceptible to impressions than is the other.

Perhaps one of the most common errors among begin-

Cut 12



Palpating the Second Finger to Develop the Sense of Touch

ners is to favor that side with which they are more accurate. This is distinctly a mistake and the student would do well to realize the importance of an equal development, and seek rather, to impose upon the deficient member an excessive amount of work in order that it might develop the same degree of accuracy as is displaced by its fellow.

Palpation Drill No. 3. With the middle finger of either hand extended and held in a comfortable position before the palpator the opposite hand should be used as palpating hand, in gliding over the dorsum and lateral surfaces of the extended finger. Due attention should be given to the various sensations obtained as the fingers pass over the various parts of the member being palpated. Practically the same procedure is followed here as in the preceding drills, the changes being for the purpose of relieving the monotony of unvaried concentration as well as to develop an equal degree of proficiency in both hands.

It might be suggested in this drill that the palpator make every effort through concentration and attention to feel every slight variation in the surface over which his palpating fingers travel. Now alter the degree of pressure, making it heavier each time and keep this up for several minutes, gradually increasing the degree of pressure. In this manner it will be determined that the acuteness of the sensation is gradually decreased and thus actual proof will be disclosed substantiating the contention that a delicate pressure is much more advantageous than is a heavy pressure. On the other hand the palpator may seek to make the pressure lighter each time as he travels over his surface, and while he will not notice a great deal of difference in a few moments, he will, if the process is continued for a week's time, a few minutes each day, be satisfied that his ability to interpret the impressions received is more acute if a light touch is employed.

THE VALUE OF INSPECTION

All knowledge upon any subject is arrived at through the impressions received by means of the five special senses. The process of palpation depends entirely upon the sense of touch. However, the palpator is often led to employ inspection or visual examination as an accessory aid in the accomplishment of this end. The eye of the trained observer readily detects all general major abnormalities or irregularities in the shape and contour of the spine. This includes curvatures, posture upon standing or sitting, discoloration of the skin, eruptions or oedema, all of which are of value in indicating the region in which the expected subluxation lies.

While the following may not be discovered by inspection, they are of value in that they often point unerringly to the involvement of a certain definite region of the spine. Dryness, moisture, odor, scaliness, pigmentation and abnormal heat of the skin all point to the presence of a subluxation of the region of the lower dorsal vertebrae.

Under the head of postures we have several. A marked tilting of the head to one side usually indicates a cervical curvature in the opposite direction or a marked subluxation of the atlas. Any unusual difference in the height of the shoulder is indicative of the scoliosis in the upper dorsal region, the convexity of which is toward the higher shoulder. If the head of the patient is held well forward and the shoulders are drooped, there is usually the condition of an asthmatic hump or slight kyphosis in the lower cervical and upper dorsal regions, while there is an adaptative lordosis in the upper cervical region. When there is a marked lateral curvature in the lower lumbar region it will be found that the pelvis is tilted and the ilium toward the concavity of the scoliosis will be superior. This variation in the hips of the patient is readily noticeable by the posture in standing. Stiffness or immobility of any part of the spine, with absence of muscular contraction indicates ankylosis in that region. An acute

kyphosis with tenderness and redness of the overlying skin is usually indicative of Pott's Disease and points to a local subluxation. A fistula found in the thoracic area is usually the result of empyema and is indicative of a subluxation in the region of the third dorsal vertebra. If found in the lumbar region it is indicative of a local subluxation in that area.

Inspection often assists in making a palpation where there is a broken off spinous process or where it may have been removed by surgical means.

A rotatory scoliosis cannot always be determined by inspection, but if the rotation is in the dorsal region and is marked in degree it necessarily affects the contour of the ribs and is readily visible. If the curvature involves a right rotation, the ribs on the right side are thrown somewhat toward the posterior and assume a greater degree of prominence than those on the other side. It can therefore be readily understood why this condition cannot be detected by inspection if it is only slight, while if it is more pronounced it can be readily detected.

There is no hard and fast rule in the determination of the rotation from the direction of the scoliosis. If, for instance, a right scoliosis is detected by inspection it may be either a right or a left rotation because the rotation is determined by the relationship between the individual bodies of the vertebrae and the spinous processes without considering the curvatures as a determining factor.

While it is true that rotatory scoliosis can be readily determined by inspection in the dorsal region, this is not true in the same degree of the dorsal and cervical regions. Here we do not have the attachment of ribs, and the soft tissues more readily accommodate themselves to the altered positions of the vertebrae so that they offer the least possible disturbance to the general contour of the surface opposite the involved spinal segments. Here, however, the matter is purely one of degree and if the curvature is sufficient in extent, it can also be recognized through inspection.

Care should be taken not to confuse the postures mentioned above with the posture which a hemiplegia case is forced to assume. Then, too, in hemiplegia there is more or less wasting away of the muscles on the affected side, particularly those of the two extremities, the shoulder and the hip. This naturally causes an appearance which is not uniform and might easily lead to confusion through inspection.

LANDMARKS

The spine is divided into three anatomical regions, viz: the cervical or neck region, the dorsal or thoracic region and the lumbar or loin region. There are seven cervical, twelve dorsal and five lumbar vertebrae, making a total of twenty-four movable vertebrae in the spine. The seventh cervical vertebra is the most important vertebral landmark because of its extreme prominence. It is because of this fact that it has been designated as vertebra prominens.

As a rule, the seventh cervical vertebra is the first vertebra to possess a long spinous process and this spinous process usually projects more nearly horizontal than do the spinous processes immediately above and below it. It can frequently be located by observation and when the head is held in the erect position it is the first vertebra to disclose a prominent spinous process. It is also, as a rule, the first vertebra that does not move perceptibly when the head is alternately bent forward and then backward. This is because of the fact that it is held more firmly in position than those above, by articulating with the first dorsal vertebra which is supported by the ribs and by being attached through ligamentous connections to the thoracic vertebrae.

By locating a point on each shoulder midway between the root of the neck and the tip of the acromian process at the upper border of the shoulder joint and drawing a line across the neck between these two points, it will be found to fall upon the spinous process of the first dorsal vertebra.

Sometimes the following method is employed in determining the first dorsal vertebra for palpation, viz: place the first finger of the palpating hand on the tip of the vertebra which you suppose to be the sixth cervical. Place the second finger on the tip of the spinous process of the one below it and the third finger on the tip of the spinous process covered by the second finger. Now by placing the free hand on the forehead of the patient and gently drawing the head back and flexing it forward alternately, it will be found that the sixth cervical vertebra is the only one which will disclose movement, becoming less prominent as the head is drawn backward and more prominent as it is flexed forward. Thus, if your first finger is in reality on the sixth cervical vertebra, as you assume in your premise, then it is the only finger which will move as the head moves. If this method is employed it should only be used as a means of verifying your finding and proving your original conclusion as to the location of the first dorsal vertebra.

Further, extreme care should be exercised in flexing the head of the patient and drawing it back so that the least possible inconvenience may be experienced by the patient. A common fault is to produce this movement too rapidly and this often leads to actual ill effects upon the patient. The cervical vertebrae being more or less movable, if the head is moved forward or backward too rapidly or too far, subluxations may be produced or existing subluxations aggravated to the extent of bringing on a headache or other forms of incoördination.

By drawing a line between the lower angles of the scapulae, it will be found to fall upon the spinous process of the sixth dorsal vertebra as a rule, but occasionally cases are met which show this line falling on the seventh dorsal vertebra.

The twelfth dorsal vertebra is the last one to have a pair of ribs attached to it. While it is not always possible to palpate the lower ribs, particularly in a patient who possesses an extremely heavy set of back muscles, still where this is possible, it serves as a valuable aid in verifying one's count of the spine.

A straight line drawn from the crest of one ilium across the back to the crest of the opposite ilium will fall upon the interspinous space between the spinous processes of the third and fourth lumbar vertebrae.

The student naturally asks the questions, "What is the purpose of knowing these anatomical facts when one's sole purpose is to make a correct palpation?" The answer is that it not only assists the practitioner in proving that his count of the spine is correct, but by knowing the peculiarities of the spine, as for instance, that the seventh cervical vertebra is always very prominent because of the long spinous process, it eliminates the possibility of his listing apparent subluxations which are, in reality, the result of a peculiarity of these vertebrae.

IMPORTANCE OF CORRECT COUNTING OF VERTEBRAE

Few Chiropractors indeed, realize the importance of a correct count of the vertebrae of the spine before attempting to do any listing. As a matter of fact, however, it is one of the most essential features of the work. In the first place, if the Chiropractor forms the habit of always counting the spine, he can make a definite report as to exactly which vertebrae are subluxated and thus adjust the same ones each day. This tends to bring about results more rapidly because of the specific work accomplished.

Furthermore, the counting of the spine and the listing of the vertebrae in accordance with this count, standardizes the system of Chiropractors throughout the entire world, and if necessary one practitioner may step in and care for the patients of another, merely by looking up the analytic record of the cases.

There is, moreover, a third reason which is perhaps more important than either of the foregoing. We know that for every incoördination there is an impingement produced by a subluxation. Experience has taught, and the fact is borne out

by anatomical findings that the nerve emitting from between two particular vertebrae in the spine supply, in all cases, approximately the same areas. With this as a known fact it is not only easy for the Chiropractor to first locate a subluxation and then determine what organs or tissues would be involved by a subluxation of this vertebra, but it is as equally easy for him to determine by the symptoms of the case what organs are affected and thus mentally trace the nerve fibers from the organs involved to their points of emission between two adjacent vertebrae. By following this mental process, he knows that a certain particular segment of the spine or the one immediately above or below it must be subluxated in certain diseased conditions. Now, in order to arrive at a conclusion which is absolutely correct, the palpator must be able to make a correct count of the spine.

For example we will assume that the symptoms disclosed by the patient all point to a primary involvement of the liver. Experience and anatomical findings have already established the fact that if the liver is involved it is because of an impingement on the nerve fibers emitting from between the third and fourth dorsal vertebrae or between the fourth and fifth dorsal vertebrae. Because of this fact, the fourth dorsal vertebra has been designated as Li. P. (Liver Place). With this knowledge and with the ability to count the vertebrae of the spine accurately it is very easy for the palpator to locate the three vertebrae, any of which may be involved by the subluxation, one of which is producing the impingement responsible for the diseased condition.

It should, however, be distinctly borne in mind that whenever a nerve fiber is impinged it may result either from a subluxation of the vertebra immediately above or that immediately below the impinged nerve. Further, it must be remembered that a subluxation of any vertebra may produce impingement upon the nerve fibers emitting between it and the one above or between it and the one below. For this reason, the terminal distribution of a single nerve trunk, sometimes

being very extensive, it is possible for the subluxation of a single vertebra to involve a very wide area. In brief we know that for every incoördination there is a certain region in the spine in which we may look for the causative subluxation. If we are thorough in making our count we know that this subluxation or this combination of subluxations should be present in a given area and thus we are greatly aided in making our palpation.

There are many other reasons why the practitioner should be absolutely accurate in the counting of the segments of the spine before he attempts to list the vertebrae or make any record of the case, but these will suffice to show the great importance of such procedure.

It may be that cases will be met with which only have twenty-three movable vertebrae and possibly those which have twenty-five, but these are relatively few and may be determined by a careful count of the spine from the atlas to the sacrum.

BENT SPINOUS PROCESSES

Frequently the palpator meets with what appears to be a marked subluxation, yet fails to find an incoördination which would result from it. Possibly the reason for this is that what apparently is a subluxation is in reality a bent spinous process of the vertebra in question and that in reality there is no existing subluxation whatever. Now the question presents itself: "How am I to determine whether there is a true subluxation or whether it is an abnormality of the spinous process?" This can only be determined by palpating the transverse processes as well as the spinous processes and then measuring the distance from the tips of each transverse to the tip of the spinous process.

This is done by measuring down to the tip of the spinous process of the vertebra in question and, while holding the tip of the second finger on the tip of the transverse process, measuring toward the superior to the level of the transverse pro-

Cut 13

Showing the Proper Method of Determining Whether or Not the Spinous Process Is Bent

cesses. This level is materially different in different regions of the spine and extreme care should be taken to determine what this measurement is for the particular vertebra in question before progressing in the palpation. For these measurements, we refer the reader to the section under nerve tracing where each vertebra is carefully considered and these considerations are based upon a composite spine seeking to establish, as near as possible, a system which can be relied upon in the average case.

It has been customary among some chiropractors to state that the transverse processes are two interspinous spaces above the spinous process. This is not always true. In the middle dorsal region this statement can be made and it will be found that it is accurate, but in the upper and lower dorsal regions it does not apply because the pitch of the spinous processes differs in these several regions. In the upper dorsal region they do not assume as acute an angle toward the inferior as in the middle dorsal region. While in the upper dorsal region they also point more nearly straight backward from the body of the vertebra.

Having determined the level at which the transverse processes should be found, careful measurement should be made with the first finger of the palpating hand to the point, about one and one-quarter inches to the side of the line of the spinous processes. This measurement should first be made on the side opposite to that on which the palpator is standing.

The palpating hand should now be turned so that the palm is facing the back of the patient with the wrist straight above the tip of the second finger. In this position the tip of the third finger should palpate for the transverse process which has not yet been located, at about the same level as its fellow on the opposite side and an equal distance from the line of the spinous process. If both tips of the transverse processes are equally distant from the tip of the spinous process, it can be safely assumed that an actual subluxation exists, but if the space between one transverse and the spinous

process is greater than that on the opposite side, there must be a bent spinous process. It can be safely assumed in this event that the process is bent toward that side on which the space is less, and away from that side on which the space is greater.

This method, however, cannot be carried out in the lumbar regions nor in the regions of the eleventh and twelfth dorsal vertebrae. This for the reason that the eleventh and twelfth dorsal vertebrae present rudimentary transverse processes, while in the lumbar region the processes are very deeply buried in the muscles of the back, so that it is practically impossible to locate their tips. In the cervical region, palpation should be made by standing posterior to the patient and palpating downward on both sides of the neck with the palpating fingers of both hands on the transverse processes of their respective sides. In this manner it can be determined whether or not these transverse processes are at the same level. If they are, and if the spinous process shows a variation toward one side or the other, the spinous process must be bent unless the entire vertebra is rotated. If it is rotated the transverse process on the side toward which the spinous process is apparently subluxated, will be found further anterior than its fellow on the opposite side. If, on the other hand the spinous process on the side toward which the spinous process is apparently subluxated, is at a higher level than its fellow on the opposite side, there is ample proof that the vertebra in reality is actually subluxated. These directions are given here in order that the palpator may employ the best possible method in determining the existence of a bent spinous process in the cervical and upper dorsal regions. In brief, if the distance is equal between the two transverse processes and the spinous process, then it may be assumed that the spinous process indicated the true position of the vertebra. If one measurement is shorter than the other, however, then it can be readily seen that the spinous process is bent toward that side which shows the shortest measurement.

No attempt is here made to conceal the fact that in some parts of the spine an accurate palpation of the transverse processes cannot be made because they are so deeply buried in the softer tissue. Rather, we are frank to admit the limitations of palpation in these particular areas and the only way to determine accurately whether or not the spinous process is bent is to make a spinograph plate of the case and make the actual measurements from it. Then again, there are those cases which have extremely heavy back muscles even in the dorsal regions, so that it is impossible to palpate the transverse processes with accuracy. In these cases again the spinograph must be resorted to in order to arrive at an accurate conclusion. The same condition may exist in the neck wherein the transverse processes are so deeply buried in the muscle fascia that they cannot be palpated.

IMPORTANCE OF KNOWLEDGE OF NORMAL SPINES

Before any individual may become proficient in the detection of any abnormality not only in the human mechanism but of any mechanical structures, he must first thoroughly acquaint himself with the normal structure and functioning of that mechanism.

No mechanic should think of looking for the trouble in a motor unless he first knows how that motor was constructed and how it was intended to run, for the obvious reason that he would not be aware that it was not acting in a proper manner. Neither is it possible for a Chiropractor to determine the presence or location of subluxations unless he has a complete understanding of how that spine should feel if it were perfectly normal.

If he did not know these things, he might assume that the primary and secondary curves of the spine were curvatures and attempt to correct them, thus doing much damage. On the other hand he might assume that the seventh cervical ver-

tebra, owing to its extreme prominence, was subluxated to the posterior and attempt to adjust it toward the anterior.

There are any one of many things that he might attempt to do owing to his lack of knowledge which would certainly not work for the betterment of his patients. It can readily be understood then, that it is imperative for the practitioner to possess a complete knowledge of the normal spine in order that he may compare the impressions which he gains of the spine of his patient with the memory he has of a normal condition.

Normality is determined by the majority of the human species who possess a given form. As this is true of the human species as an entity, it is also true of the individual parts of the human mechanism. If, for instance, we find that the majority of seventh cervical vertebrae possess a long spinous process, we call that condition normal and any variation from it is abnormal to the average case, although it may be perfectly normal to the individual in which it is found. As this is true of the shape and size of the vertebrae it is also true of the position. We find that, as a matter of fact, the vertebrae of the spine are arranged as a continuous column. one immediately above the other and with the articulating processes normally in direct apposition. When there is any divergence from this general form we designate the abnormal position as a subluxation and by restoring it to its original position we restore normality and the patient regains health.

It might be argued that because the normal spine has only been found in a comparatively few individuals, that the abnormal condition because of its prevalence, becomes the normal. If the spine were to be considered as a unit, this might be true, but as a matter of fact, we find that it is divided into many segments and while, in some parts of the spine, there usually exist subluxations, those subluxations are confined to a comparatively few segments.

If a single vertebra is considered as a unit, we find that in the majority of cases, it assumes a given regularity in its

relationship with the vertebrae above and below. This usual position shows it in the median line with its articulating surfaces in contact with those of the vertebrae immediately above and below. Because this is true in the majority of cases, the average position is taken as the standard and is called the normal, and any variation from that position is classed as abnormal.

DISTINCTIVE FEATURES OF CERTAIN VERTEBRAE

Although we have stated in a general way the relationship which the different vertebrae of the spine bear to one another, yet if the palpator were not familiar with the peculiar features which some vertebrae disclose upon palpation he would naturally be led to the conclusion that subluxations actually existed when, as a matter of fact, the condition was entirely normal. It is for the purpose of acquainting the palpator with these peculiar vertebrae that the following descriptions are given:

Axis. This vertebra is the first one of the segments possessing a spinous process which shows a marked peculiarity. It possesses a very long spinous process which would lead the palpator to believe that it was subluxated toward the posterior if he compared it with the other cervical vertebrae below. Not only is the spinous process long, but it shows a much heavier construction than do the other cervical vertebrae and in making the palpation one should not imagine that this is the result of an excessive growth on the tip of the process. Further, there is a wide variation in different specimens, some of them showing a deep bifurcation while others show only a slight depression in the median line. Where a deep bifurcation discloses itself the two lateral prongs are usually well developed and the tip of the spinous process is thus very broad. Sometimes one of these prongs is longer than the other and extreme care should be exercised in making the palpation, to locate the medial groove and make the comparison from this center. This elongation of one prong

does not indicate any particular subluxation and in fact, many cases show this peculiarity which have no subluxation of the axis at all.

Another peculiar feature is that the tip of the spinous process on the axis sometimes hangs over the third cervical vertebra by bending down at its tip. When this occurs, care should be taken not to confuse this peculiarity with an inferior subluxation of the axis and thus make a listing when none should be made. If the palpator is at a loss to know

Cut 14

The Axis

whether an actual subluxation exists or whether the apparent subluxation is the result of a peculiarity in the construction of the vertebra, he should fall back upon his knowledge of nerve tracing and symptoms, determining what symptoms, if any, are arising from an impingement in this region and then seeking to locate the tender nerves if there are any present.

Third Cervical Vertebra. The third cervical vertebra in itself is peculiar in that it possesses a wide variation in the

length of its spinous process. There are some cases which disclose a spinous process almost as prominent as that of the axis, while there are others which show a spinous process so short that difficulty is experienced in locating it below the prominent axis. Because of the wide divergence in different specimens in the third cervical vertebra, each one, perfectly normal in itself, the Chiropractor should exercise the same extreme care in making his palpation here as he does in palpating the axis. Here too, we have bifurcation of the spinous process showing sometimes, a deep groove in the median line and sometimes merely a depression which is hardly noticeable. In all of the cervical vertebrae down to and including the sixth cervical vertebra, this condition is true and the Chiropractor should never lose sight of the fact that in this region one of the prongs may be longer than the other and thus lead him to an erroneous conclusion. This can only occur, however, if he fails to locate the center of bifurcation. This center of the bifurcation always indicates the median line of the spinous process and it is these median lines of the several adjacent vertebrae in this group which must be compared in determining the laterality.

Sixth and Seventh Cervical and First Dorsal Vertebrae. These three vertebrae are here described in the same group because of a peculiarity which sometimes exists in one and sometimes in another. Then again cases are found where the same peculiarity manifests itself in all of them and sometimes very great difficulty is experienced in determining whether an actual subluxation exists or whether the condition is only an apparent subluxation caused by the peculiarity. This distinctive feature is the presence of long spinous processes which are placed more nearly in the horizontal position than are those of the cervical vertebrae immediately above or the dorsal vertebrae immediately below this group. This horizontal position is made so by the beginning in this region of the first primary curve and also by the fact that the spinous process itself extends more nearly parallel with the plane

formed by the upper or lower surface of the body of the vertebra to which it is attached.

Not only do these spinous processes extend in a more horizontal position but either in the sixth, seventh or first, we have the beginning of long processes which are more or less distinctive throughout the entire upper dorsal and middle dorsal regions. Sometimes the first vertebra to disclose this long process is the sixth cervical vertebra. Sometimes it is the seventh cervical and sometimes the first dorsal vertebra. In the majority of cases, it is the seventh cervical vertebra which shows the longest spinous process and the one which is the most apparent upon palpation. If this were always true, one could easily establish a rule whereby the palpator could be made aware of what to expect in palpating the seventh cervical vertebra. However, the long spinous process may first manifest itself on the sixth cervical vertebra and the seventh cervical vertebra by comparison be not as apparent upon palpation. Then again, cases are frequently met which disclose a first dorsal vertebra with an extremely long and horizontal spinous process which by comparison, shows the seventh cervical spinous process to be short.

Thus one can readily see why it is necessary to realize that this peculiar feature, while it is most often a distinctive mark of the seventh cervical vertebra, may be present in any of these three.

Were it not for this knowledge, the palpator might discover a sixth cervical vertebra which by comparison with the seventh cervical and first dorsal vertebrae appeared to be posterior. He would immediately conclude that the sixth cervical vertebra was subluxated to the posterior and if he adjusted it so, he would be in error. However, with his knowledge that the condition may exist in any one of the three and still be perfectly normal to the individual in which it is found, he need have no fear of arriving at an inaccurate conclusion.

Tenth Dorsal Vertebra. This vertebra is given among

the peculiar vertebrae because of the fact that it is the first one of the lower dorsal group to show a spinous process distinctly shorter than the ninth and placed in a more horizontal position. This being true, the inexperienced palpator might easily be led to the conclusion that it was posterior and superior when, as a matter of fact, it merely appears to be so from the alteration which takes place here in the length and erection of this spinous process. The majority of cases disclose this peculiarity and although it is not as apparent as the peculiarities in some of the other vertebrae, it should be borne in mind at all times in palpating this group, to avoid the possibility of error.

Twelfth Dorsal Vertebra. This vertebra is listed among the peculiar ones because in many cases it possesses a spinous process which closely resembles those found on the lumbar vertebrae. When this occurs the palpator finds that the twelfth dorsal vertebra appears to be posterior, not only because the spinous process is somewhat longer than those immediately above, but also because this apparent posteriority is made more apparent by the broader and heavier tip which is disclosed. If the palpator did not know that the twelfth dorsal vertebra often resembled a lumbar vertebra so far as the spinous process was concerned, he would erroneously arrive at the conclusion that it was subluxated toward the posterior and thus he would be in error.

The Lumbar Group. This entire group is here given because of a peculiarity which sometimes occurs in it but which need not be considered as distinctive, because as a matter of fact, the condition is more or less unusual. We refer particularly to the fact that the spinous processes of the lumbar vertebrae are sometimes bifurcated by longitudinal depressions and the sensation given upon palpation is that there are two distinctive tips to the spinous process. When this is true, care should be taken to glide the palpating fingers along the grooves which are thus formed, making the comparisons as to laterality entirely from these grooves, because they in-

dicate the median line of the spinous process. Very occasionally, it would be found that the tips of the spinous processes in the lumbar group are divided by horizontal grooves into upper and lower divisions. In this event, the only errors that are apt to occur are those of inaccuracy in the count and an uncertainty as to the superiority or inferiority of the vertebrae. Care should be taken in these cases to determine which are the actual spaces between the spinous processes and which are the grooves dividing them into two divisions. When this has been determined a comparison should be made of the relative spaces that actually exist between the spinous processes and no attention given to the grooves which divide them.

Fifth Lumbar Vertebra. This vertebra is peculiar in that it possesses a short spinous process as compared with those on the other lumbar vertebrae. If one were not aware of this fact, one would find it extremely difficult to determine posteriority of the fifth lumbar vertebra. In palpating the fifth, he might find that it discloses the same degree of prominence, as the other lumbar vertebrae and he would pass this particular one by without gaining the knowledge that it was actually subluxated to the posterior. The experienced palpator, however, realizing that the fifth lumbar vertebra has a spinous process which is shorter than the other ones in the group, immediately is aware of the presence of a posterior subluxation when he finds the fifth lumbar vertebra with the same degree of prominence as the others possess.

LISTING

To the beginner the logical order of procedure in learning to palpate the various sections of the spine, is by beginning with the dorsal and lumbar vertebrae. Later the sacrum and ilii should be included and lastly the cervical vertebrae. This for the reason that the dorsal and lumbar processes are more accessible and offer less complexity in listing. The cervical vertebrae should be considered lastly because they are more deeply imbedded in the muscular tissue, have short spinous

processes and small bodies, thereby producing greater difficulty in the detection of minute irregularities.

It is more for the sake of convenience that they are considered in the following pages in their regular anatomical order, beginning at the upper and ending at the lower extremity of the spine.

THE NORMAL SPINE FROM PALPATION

In the beginning it may be stated that there are two primary and two secondary curves, the primary existing at birth and located in the upper dorsal and sacral regions, while the secondary are developed after the child begins to assume the erect posture and are found in the cervical and lumbar regions. It must be remembered that these primary and secondary curves are normal conditions and they should not be confused with kyphoses or lordoses, which are curvatures. In order that this mistake may be avoided, it is advisable to familiarize oneself by the study of anatomical charts with the general outline and shape of the spine together with its relationship to the adjacent structures.

In the normal being there is a distinct difference in the shape and size of the spinous processes which should be thoroughly understood. In the cervical region, from the axis to the sixth, inclusive, the tips of the spinous processes are bifurcated, the center of the bifurcation lying in the median line of the spinous process with a prong-like projection on either side of it. These prongs may be of different sizes and shapes and are never to be relied upon in palpation of the cervical vertebrae. It may be further stated that the spinous processes, like the bodies and transverse processes are small and delicate as compared with other regions. It should be borne in mind that the spinous process of the axis is much larger than those in close proximity with it. Therefore the palpator should not judge an axis to be subluxated posteriorly when he finds this apparent posteriority, unless the symptoms point to the fact that nerve fibers in this region are actually

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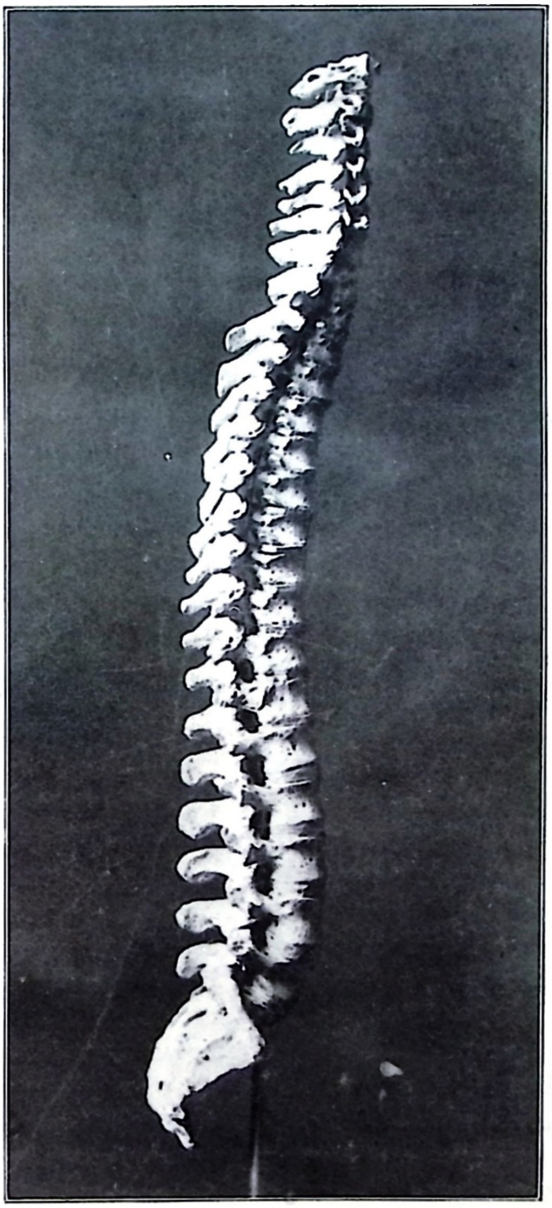

Showing Primary and Secondary Curves of the Normal Spine

involved. Again it should be impressed upon the mind that a knowledge of the normal segments of the spine is of extreme importance, and this knowledge can best be derived from a study of charts or of actual bones themselves. The extreme prominence of the seventh spinous process which is not bifurcated should also be remembered that the same mistake may not be made here. The first secondary curve of the spine is found in the cervical region. This is a normal anterior curve hence the middle cervical vertebra will not be as prominent as the other, and this condition should not be confused with lordosis.

The first primary curve of the spine lies in the upper dorsal region and is a posterior curve, not to be confused with kyphosis. There is no radical difference in the outline in the spinous processes as in the cervical region. They are not bifurcated and their tips are rounded or slightly pointed, giving the impression, upon palpation of gliding over a row of elevations, each about the size of a small olive. If a line is drawn from above downward over the center of these tips, there should be no lateral variation and this line should equally divide the surface of the back. Often the spinous process of the twelfth dorsal vertebra and occasionally the spine of the eleventh dorsal vertebra is found to be more massive than the others, simulating the spines of the lumbar vertebrae.

One should never neglect to palpate the transverse processes of the dorsal vertebrae. They also present a perfect alignment from above downward, following the contour of the primary curve, and a line drawn over the posterior margin of their tips, should show no posterior variation from the general contour of the back. Careful anatomical observation shows us that the transverse process of a given dorsal vertebra is not directly opposite the tips of the spinous process, but is superior to it, the distance varying in the different portions of this region. From the fourth to the eighth dorsal vertebrae, inclusive, measurement should be made from the spinous process to the second interspinous space above and outward

approximately one and one-fourth inches to locate the transverse processes. Both above and below this portion this superior arrangement gradually decreases until when the first and twelfth are to be located it has been decidedly altered. The transverse processes of the first dorsal vertebra are directly opposite the spinous process of the seventh cervical vertebra, while those of the twelfth dorsal vertebra are opposite the interspinous space between the eleventh and twelfth. Also in locating transverse processes of those vertebrae below the eighth, the latter measurements should be gradually decreased until when the twelfth is reached, it is approximately only three-fourths of an inch.

The palpation of the lumbar vertebrae reveals the fact that they have broader and more massive spinous processes and this must be kept in mind while palpating them. They, like the dorsal vertebrae should present no lateral deviation and are of about equal posteriority except the fifth, which has a shorter spinous process than the other four. The transverse processes of the lumbar vertebrae are more deeply imbedded and further from the line of the spinous processes than in the dorsal region. To determine the location of the transverse processes of a given lumbar veterbra the measurement should be made to the first interspinous space above the spinous process and laterally from here about one and one-half inches. It is very seldom possible to make a palpation of the transverse processes in this section of the spine because of their depth from the surface. The second secondary curve of the spine lies in the lumbar region and is an anterior curve, not to be confused with a lordosis.

The distance between the spinous processes in any part of the spine is approximately the same as the thickness of the bodies in that particular region. This is not absolute because of the presence of the intervertebral discs, the different angles which the spinous processes make with their bodies and the difference in the thickness in the spinous processes. However,

it approximates the absolute enough that it may be used in the average calculation.

It is in the sacral region that we find the second primary curve which is toward the posterior and is not so apt to be confused with a curvature as are the preceding curves, because its segments are few and always bear the same relationship to one another.

The knowledge of the position of the normal sacrum must be made by a study of charts or manikins from which it will be seen that the posterior surface of the sacrum is triangular in shape and curved gradually outward, thus completing the symmetry of this important line shaft of man. The apex of the sacrum is situated more posteriorly than the base when the patient is either standing or sitting in the proper posture. As a rule, it has only rudimentary spinous processes but this deficiency is compensated by its posterior curve as compared with the anterior curve in the lumbar region. It is also found upon palpation that each lateral mass presents a like prominence and a like comparison with the ilii.

The coccyx is a small triangular shaped bone found in the median line of the body and completes the primary curve which is largely formed by the sacrum. Normally the coccyx forms a curve which follows the same general direction which is followed by the sacrum and the determination of whether or not the coccyx is subluxated to the anterior or to the posterior is determined by comparing its curve with that shown by the sacrum.

The ilii articulate with the superior portion of the lateral margins of the sacrum and their posterior superior spines bear like relations to the sacrum and are about three-eighths of an inch posterior to the posterior surface of the sacrum.

TECHNIQUE OF LISTING

Atlas. The most difficult of any of the vertebrae of the spine to list is the atlas, for the reason that it may be subluxated in more directions than any other vertebra; it is also

difficult in that the palpator is receiving impressions from two sets of corpuscles located, respectively, in the finger tips of each hand and he must make a comparison of these impressions before a decision can be reached as to its position, while in the palpation of every other vertebra all impressions are received by means of the tactile sense in only one hand.

The patient should be prepared and seated in the proper manner as heretofore described. The palpator should stand directly behind and facing his patient and should use both

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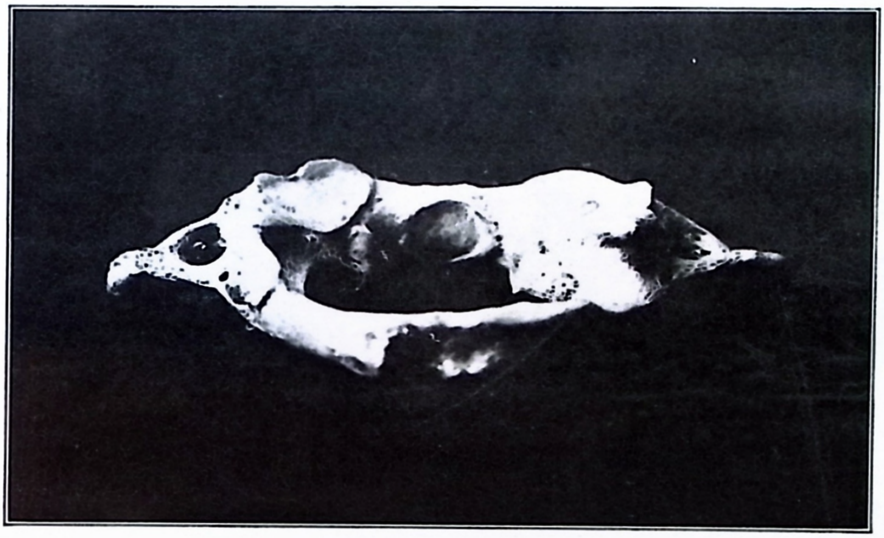

The Atlas

hands. The second finger of each hand should be placed upon the tip of the transverse process of the atlas; holding this contact the first finger should be placed upon the mastoid process of the temporal bone and the third finger upon the ascending ramus of the mandible below and in front of the original contact of the second finger. The fingers having been once placed in this correct position should not be moved because if this is done, conflicting impressions may be obtained. It is the purpose of the palpator in placing the first

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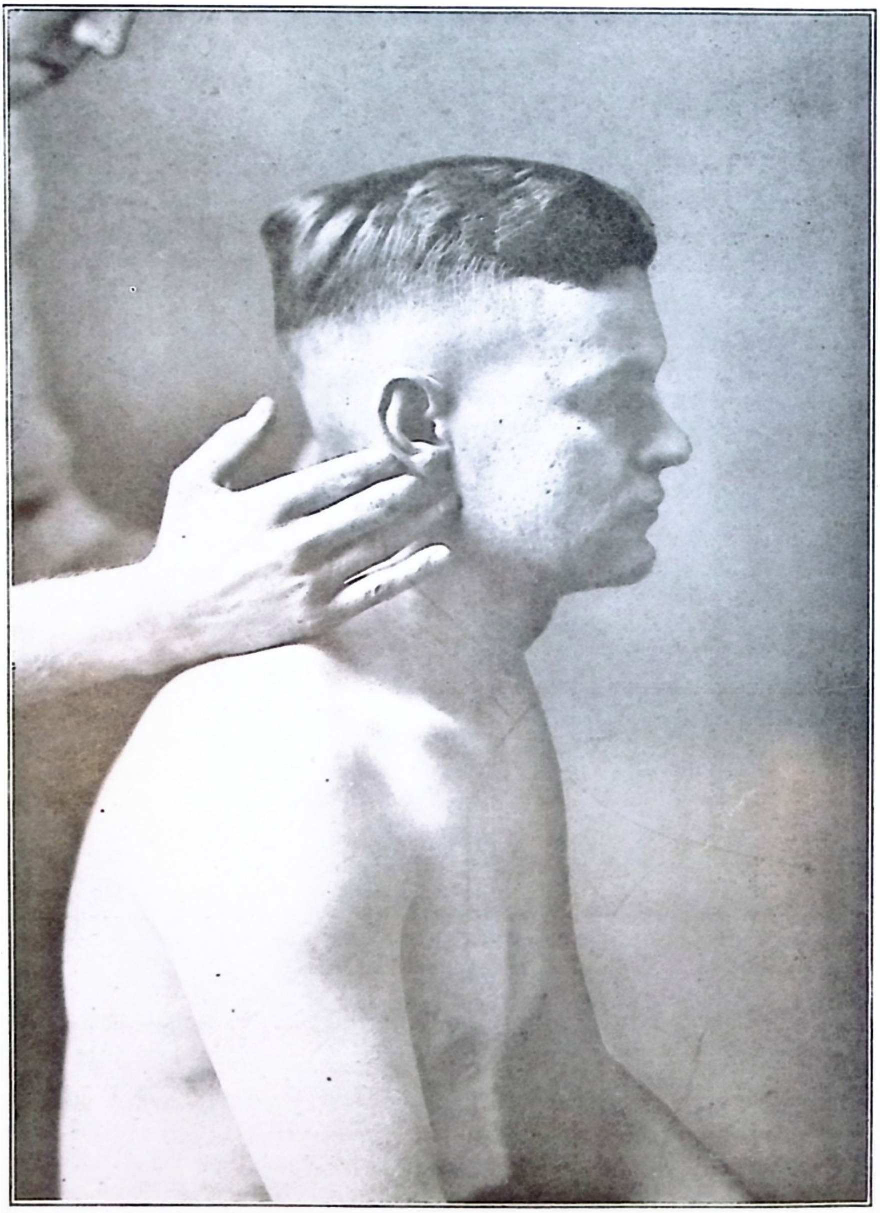

Correct Position for Palpating the Atlas

and third fingers upon the mastoid process and the ascending ramus of the mandible, to locate two anatomical landmarks which may be used as a basis in comparing the positions of the transverse processes. For this reason extreme care should be taken to note that the first finger of each hand is placed on like points on each mastoid process while the third fingers are placed in like positions on the ascending rami of the mandible. Normally each transverse process is found near the apex of the angle formed by the mastoid process and the ascending ramus; directly behind the lobe of the ear and about equally distant from each landmark. The tips of the processes should each be equally distant from planes extending through the ascending ramus of the mandible and from here directly toward the posterior, thus making the two planes parallel with each other. If this condition does exist the transverse processes are felt equally prominent and each one is the same distance from the apex of the angle formed by the mastoid process and the ascending ramus.

The first consideration is that of laterality and the conclusion is arrived at by comparing the prominence of each transverse process with that of the other. This comparison is made by determining which transverse process is closer to the imaginary plane (described heretofore). The one being nearer to that plane designates the laterality of the subluxation and thus the first direction of our listing is determined. Thus, if our fingers are properly placed and by careful examination we determine that the tip of the right transverse process is nearer to the plane on its side than the tip of the left transverse process is to its plane, we have arrived at our first conclusion, which is that the vertebra is subluxated toward the right. We indicate this direction by the symbol R. On the other hand, if we find, by comparing the two sides that the left transverse process is nearer to the plane on the left side than is the right one, our first conclusion is that the vertebra is subluxated toward the left. We indicate this direction by the symbol L. The remainder of the listing is for the purpose

of determining in what other directions this prominent transverse process is subluxated with the transverse process of the opposite side.

After having determined that one transverse process is more prominent than the other, it should be further determined whether this prominent process is anterior or posterior as compared with its fellow on the opposite side. This is done by comparing the position of the second fingers which are placed upon the transverse processes, with the fixed point, upon which are placed the first and third fingers. For example, if we find that the right transverse process is nearer the ascending ramus of the mandible than is the left, we are certain that the atlas is swung upon the odontoid process as a pivot, but only the anteriority or posteriority is designated for that transverse process which has previously shown the greatest degree of prominence. In brief, if the second finger on the prominent process is nearer the ascending ramus of the jaw than the second finger of the opposite hand, it will be listed anterior; if nearer the mastoid process than the opposite one, it will be listed posterior, and thus the second direction of our listing is determined.

The third point of comparison is for the purpose of determining whether the prominent transverse process is superior or inferior. If the second finger on the prominent process is nearer the apex of the angle formed by the mastoid process and the ascending ramus of the jaw, it will be listed superior; if further from the apex of this angle, it will be listed inferior and thus the third direction of our listing is determined.

There are twenty different listings which may be made of the atlas. The first one of these is that which has laterality alone. This laterality may be either to the right or to the left. If to the left, it is indicated by the symbol L while if it is to the right, it is indicated by the symbol R.

If the laterality is indicated by the symbol L, and if there are additional symbols to be added, these additional symbols must designate the direction toward which the left

transverse process is subluxated. In this event, the comparison must be made with the transverse process of the opposite side.

Nine of the twenty different listings possible on the atlas begin with the letter L and designate the existence of a left subluxation. If this laterality is combined with an anterior direction, it is designated by the symbol LA; if in combination with a posterior direction, it is designated by the symbol LP; if in combination with a superior direction it is indicated by the symbol LS; if in combination with an inferior direction it is indicated by the symbol LI. However, if this laterality is in combination with both an anterior and a superior direction it is designated by the symbol LAS; if in combination with an anterior and inferior direction it is indicated by the symbol LAI; if in combination with a posterior and superior direction, it is indicated by the symbol LPS; if in combination with a posterior and inferior direction it is indicated by the symbol LPI. These symbols together with the direction of straight left indicated by the symbol L constitute nine of the possible subluxations of the atlas.

Nine of the twenty different possible listings of the atlas begin with the letter R and designate the existence of a right subluxation. If this laterality is combined with an anterior direction it is designated by the symbol RA; if in combination with a posterior direction it is designated by the symbol RP; if in combination with a superior direction it is designated by the symbol RS; if in combination with an inferior direction it is designated by the symbol RI. However, if this laterality is in combination with both an anterior and a superior direction it is designated by the symbol RAS; if in combination with an anterior and inferior direction, it is indicated by the symbol RAI; if in combination with a posterior and superior direction it is indicated by the symbol RPS; if in combination with a posterior and inferior direction it is indicated by the symbol RPI. These symbols together with the direction of

straight right indicated by the symbol R also constitute nine of the possible subluxations of the atlas.

The two remaining directions are anterior and posterior and are designated by the symbols A and P, respectively. An atlas is listed anterior when neither transverse process is more prominent than the other, but when both are nearer the ascending rami of the jaw than normal. It should be remembered that normally each transverse process is located in the angle between the ascending ramus of the jaw and the mastoid process of the temporal bone, equally distant from each. Therefore, it can be readily determined if the space between the transverse process and the ramus of the jaw is less than that between the transverse process and the mastoid process. When this is the case, and when it is equally true on both sides, the listing should be made anterior without any reference to laterality.

In the same manner, one is able to determine whether the atlas is posterior on both sides without showing laterality. If palpation reveals the fact that neither transverse process shows a greater degree of prominence than the other, but if the spaces between the transverse processes and the ascending rami of the jaw is greater on both sides than the distance between the transverse processes and the mastoid processes, then it can readily be determined that the atlas should be listed posterior without any reference being made to laterality. It is impossible for the atlas to be subluxated toward the superior on both sides because to accomplish this, it would have to be separated from its articulations with the axis and impact into the occipital bone. This would only result in a cord pressure at the junction between the atlas and the occiput, but it would also draw the atlas away from the axis to such an extent that there would be no foundation or base upon which it might rest.

For this same reason it would be impossible for the atlas to be subluxated toward the inferior on both sides. If this were true, it would necessarily be impact into the axis while

it would be drawn away from its articulation with the occipital bone. This would not only produce a cord pressure at the junction of the atlas and the axis but it would allow the occiput no foundation to rest upon.

In the palpation of the atlas extreme care should be exercised that the palpator may not be led astray by abnormalities in the bone which might appear to be actual subluxations when, as a matter of fact, this might not be true. It is possible that one transverse process has upon it exostotic formations which would give the impression that the vertebra was subluxated toward the side upon which this exostosis is formed. In order to guard against such a mistake being made, the palpator should take into consideration the difference in the size of the two transverse processes if such a discrepancy does exist. If one transverse process is broader than the other, even though it is of the same degree of prominence it is apt to give one the impression that the vertebra is subluxated toward the side of the broad transverse process.

It is sometimes possible to palpate the posterior ring of the atlas on either side and above the spinous process of the axis. When this is possible, it will often lead the palpator to the correct conclusion when he could not otherwise determine due to abnormalities in the transverse processes which palpation could not reveal.

It is always well to take into consideration the symptoms which are associated and if these symptoms point to a sublaxation of the atlas it is well to give this every consideration. If, however, the symptoms do not indicate any abnormality of the atlas, and if by palpation it appears to be subluxated, it is well to refrain from adjusting it at least until such time as the spinograph is available to ascertain the actual position. Nerve tracing is also an important factor in determining whether or not to list an atlas that is apparently subluxated. If tender nerves are found emitting from between the atlas and occiput, it is a positive indication that the atlas is subluxated, while if those nerve fibers emitting from between the atlas and axis

show tenderness upon palpation, we are inevitably led to the conclusion that a subluxation, either of the axis or the atlas actually exists. The foregoing is given merely as a means of assisting the palpator in determining the actual subluxations of the atlas. It must be freely admitted that this particular vertebra, above all others, is the most difficult to palpate and requires the spinograph more often to determine the true condition.

Palpation from Axis to Fifth Lumbar, Inclusive. In the palpation of any of the twenty-four movable vertebrae with the exception of the atlas, first consideration must be as to which vertebrae are posterior. This is for the reason that whenever a vertebra is adjusted, the adjustment must be given from the posterior. Therefore, we pick out the posterior vertebrae and adjust them into alignment with the others rather than listing the vertebrae, which are apparently anterior because they could not be adjusted. Posteriority is determined by gliding the palpating fingers lightly over the tips of the spinous processes, locating those which present a greater degree of posteriority than the others. To them we give the direction of posterior and designate this direction by the symbol P. Having concluded that a certain vertebra is posterior, we then proceed to determine whether it is subluxated to the right or left. This is done by gliding the palpating fingers lightly over the lateral margins of the tips of the spinous processes, thereby determining whether or not they are in alignment with the group above and below them. If, in passing over the lateral margins, the line of palpation shows a marked deviation, either to the right or to the left, the laterality is determined and designated by the symbols R and L.

Our reading at this time will be PR or PL, as the case may be. Having determined the laterality, the next step to be taken is the palpation of the vertebrae for the purpose of discovering whether the one in question is superior or inferior. To accomplish this, the palpating fingers are glided lightly

over the tips of the spinous processes and a comparison made of the interspinous spaces directly above and below the processes in question with the other spaces of the group. Thus we have our third direction determined which is either superior or inferior and is designated by the letters S or I. If a laterality has been discovered, our reading now shows PRS, PRI, PLS or PLI. If laterality has been discovered, but it has not been determined that the vertebra is either superior or inferior, then the listing is either PR or PL. If laterality has not been discovered, but it has been determined that the vertebra is either superior or inferior, then the listing is made PS or PI.

From the foregoing it may be readily seen that the moveable vertebrae with the exception of the atlas, may be subluxated in nine different directions, viz: posterior (P), posterior-right (PR), posterior-left (PL), posterior-superior (PS), posterior-inferior (PI), posterior-right-superior (PRS), posterior-right-inferior (PRI), posterior-left-superior (PLS), posterior-left-inferior (PLI).

Listing of Cervical Vertebrae. With the exception of the atlas, the palpation of the cervical vertebrae is made much the same as in other parts of the spine. The palpator should stand at the side of his patient, with his free hand supporting the head of the patient, by placing this hand upon the forehead. The patient's head should be held in a natural position and the palpating hand should glide over the spinous processes. Remember that if the palpator is standing on the right side of the patient, the left hand is the palpating hand, while the right supports the patient's head.

The first consideration is that of posteriority and in determining the relative degrees of posteriority care must be taken to make the palpation over the bifurcation of the spinous processes. By this method we determine which spinous process shows the greatest degree of prominence, keeping always in mind the normal spine and ever realizing that those spinous processes on the lower cervical vertebrae are longer

and normally are more prominent than those in the middle cervical region. In brief, the palpator must keep in mind the fact that the first secondary curve is present in the cervical region and that as a consequence the middle cervical vertebrae will not show the same degree of prominence as do the axis and the lower cervical vertebrae.

In determining the laterality, one should not palpate over the lateral margins of the spinous processes but should glide the fingers down over the bifurcations of the spinous processes. It should be remembered that the bifurcations indicate the centers of the spinous processes and that in order to get an accurate comparison of these processes it is necessary to compare the bifurcations rather than the lateral margins.

In determining the superiority or inferiority, it is necessary to compare the spaces between the adjacent spinous processes. If, for instance, it is determined that the space between the third and fourth is great, while the space between the fourth and fifth is small, then it can readily be determined that the fourth cervical vertebra is inferior, providing all the other spaces in the cervical region are normal. It must also be remembered that the anterior curve in the cervical region throws the tips of the spinous processes at the center of this region, closer together than they are at either extremity.

Among the most common errors made in the palpation of the cervical vertebrae is that of not finding the bifurcation of the spinous processes. For instance, if the fourth cervical vertebra has a long and broad prong on the right side and a narrow prong on the left side, the palpator is very prone to assume that a right subluxation exists when, as a matter of fact, the vertebra may be in the median line. If the palpator would determine the location of the bifurcation and compare that with the bifurcations of the vertebrae, above and below, he would arrive at a correct conclusion as to the position of the one in question.

When he does not locate the bifurcation he is always in

danger of determining that the vertebra is in an abnormal position when in reality this is not true. Not only is this error apt to cause a mistake in determining the laterality, but it also is apt to lead to the belief that a certain vertebra is posterior when such is not the case. If, for instance the fourth cervical vertebra possesses a long prong on the right side, that prong will indicate a posteriority, when in reality none may exist. This can only be rightly determined by locating the bifurcation and comparing it with the posteriority of the vertebrae either above or below.

Sometimes great difficulty is experienced in finding the cervical vertebrae, and this may be due to several reasons. The ligamentum nuchae, extending from the axis to the seventh cervical vertebra, is sometimes very tense and if the patient presses his head forward it is made more tense, so that it is impossible to reach the middle cervical vertebrae. When this occurs, the palpator should have the patient raise the head somewhat and thus relieve the tension on the ligamentum nuchae so that the middle cervical vertebrae may be easily palpated.

Sometimes it is advisable for the patient to press his head forward in the hand of the palpator, thus serving to bow the cervical vertebra toward the posterior. Particularly in those patients who have a heavy thick coat of muscular tissue over the vertebrae is this advisable.

A common error in the palpation of the cervical vertebrae is that of having the patient turn his head slightly to one side or to the other or to bend the neck slightly toward one side. When this occurs, the entire cervical group is thrown more or less out of its normal alignment. Either of these errors should be closely watched by the palpator and he should hold his supporting hand in such a way that it will be impossible for the patient to change the contour of the cervical vertebrae from the normal.

Listing of Dorsal Vertebrae. In the palpation of the dorsal vertebrae, the first consideration is that of posteriority.

By gliding the three palpating fingers over the posterior tips of the spinous processes, one becomes aware of which vertebrae are more posterior than those immediately above or below it. After having determined that a vertebra is posterior, the next consideration is that of laterality. However, it should be borne in mind that in the upper dorsal region the spinous processes are longer than in other parts of the spine and it is also in this region that the first primary curve exists. It is essential to keep in mind the presence of the first primary curve here because if this is not done the palpator may assume that a kyphosis (posterior curvature) is present when such is not actually the case.

To determine the laterality of that vertebra which we have already determined is posterior, the palpating fingers should be glided over the lateral margins of the one in question as well as those immediately above and below it. This should be done on both margins of the spinous processes in order to eliminate the possibility of error which may be made if only one side is palpated. By utilizing the group method and making the palpation a continuous glide from above downward we are able to determine whether the tip of the spinous process is actually to the right of the median line or to the left of it.

Having determined the laterality of the vertebra, providing such exists, we must then turn our attention to determining whether or not the vertebra is superior or inferior This is accomplished by again gliding over the tips of the spinous processes and comparing the spaces between those vertebrae immediately above and below the one in question. If the space above the vertebra in question is greater and the one below less than the normal and if the other spaces are normal, we are inevitably led to the conclusion that the vertebra is subluxated toward the superior.

From the foregoing it may readily be determined that the dorsal vertebrae may be subluxated in any of the nine different directions, viz: posterior (P), posterior-right (PR), pos-

terior-left (PL), posterior-superior (PS), posterior-inferior (PI), posterior-right-superior (PRS), posterior-right-inferior (PRI), posterior-left-inferior (PLI), posterior-left-superior (PLS).

Among the most common errors in the palpation of the spinous processes in the dorsal region is that of palpating only on one side of the spinous processes and thus being led astray in our conclusions. For instance, if a spinous process possesses a broad tip and if we palpate only one margin, we arrive at the conclusion that the vertebra is subluxated toward the side on which we palpate. If we would palpate on the other margin as well, we would determine that the vertebra actually possesses a broad spinous process and is not, in reality, subluxated in either direction. This broad tip on the processes may also lead us to the conclusion that the vertebra is posterior because of the apparent prominence.

The palpator should also be careful not to permit the free hand to rest too heavily upon the patient's shoulders because if this is done he forces that shoulder down and produces an apparent curvature in the upper dorsal region which normally is not present. This is a very common error and one which must be watched carefully in order to avoid that tendency.

Palpators often try to determine superiority or inferiority by placing the tip of the second finger on the spinous process in question and the tips of the first and third fingers upon the spinous processes of the adjacent vertebrae above and below. Comparison is then made by the eye of the two spaces which exist between these three vertebrae. The error in this however, is that no consideration is taken of the possible abnormal conditions of the adjacent vertebrae. If, for instance, the one above is subluxated toward the inferior while the one below is also subluxated toward the inferior, one would be led to the erroneous conclusion that the vertebra in question was subluxated to the superior when this is actually not the case. If a comparison were made of several spaces above and several below the vertebra in question, it would be very easy to de-

termine whether or not the vertebrae immediately above and below the one in question were subluxated.

This is true also in making the comparison as to laterality. Here the palpator is prone to compare the adjacent vertebrae above and below and in this way his conception of the actual conditions is more or less limited. For instance, if the vertebra above and that below the one in question are both subluxated to the right and if you palpated only the three vertebrae, you would arrive at the conclusion that the one in question was subluxated to the left when, as a matter of fact, it might be in the normal position. By employing the group methods, he considers several vertebrae above and several below the one in question and in this way his findings must be accurate.

Always remember that your three palpating fingers constitute a straight edge. Remember that just as soon as those fingers are altered so that their alignment is lost, they lose their value as a straight edge and the impressions received are necessarily more or less confusing.

In addition to the palpation of the spinous processes, examination in the dorsal region is also made of the transverse processes and their relationship to one another.

This is made by gliding the palpating fingers over the posterior margins of the tips of the transverse processes, comparing their relative posteriority. If a transverse process is found to be more posterior than its fellow on the opposite side, it indicates that the vertebra is rotated with its spinous process away from the prominent transverse process. For example, if the seventh dorsal vertebra shows a prominent right transverse process, with the spinous process to the left of the general alignment, it is a rotated vertebra and is listed L-Right rotation. If, however, neither transverse process of a given vertebra shows greater prominence than its fellow, but one is found more inferior than the other, with the spinous process on the same side of the general alignment as the superior transverse process is on, then the vertebra in question is tipped or subluxated without being rotated. The differentiation be-

tween rotated and tipped vertebrae is of value in deciding whether the point of contact for the adjustment should be upon the spinous process or the transverse process. If the vertebra is rotated a better leverage is obtained by applying the force of the adjustment upon the transverse process, while if it is tipped and not rotated the force should be applied upon the spinous process.

Palpation of the transverse processes is particularly advisable for that group from the second to the tenth dorsal vertebrae, inclusive. This for the reason that these vertebrae are the ones which are more easily adjusted upon the transverse processes. In fact, the eleventh and twelfth dorsal vertebrae possess only rudimentary transverse processes, so that it is impossible to get a contact here for adjustment.

Listing of Lumbar Vertebrae. There is little to be said regarding the listing of the lumbar vertebrae which has not already been stated of the dorsal vertebrae. It must be remembered, however, that the lumbar verterbrae possess broad and large spinous processes and in making a comparison between them one should not expect to find the spaces between these spinous processes as large as those in the dorsal region.

There is the same possibility of error through not palpating on both margins of the spinous processes here as exists in the dorsal region. Also, there is the possibility of error being made because of exostotic growths on the tips of the spinous processes. Also there are cases which show an extreme tension of the supra spinous ligaments here, so that it is difficult to distinguish between the individual vertebrae. When this is true, the palpator will usually find that by gliding the fingers along the lateral margins of the vertebrae he can more readily determine superiority and inferiority because he can more accurately determine the size of the spaces between the spinous processes.

In subluxations of the fifth lumbar vertebra a comparison as to its laterality must be made not only with the lumbar spines, but also with the rudimentary processes of the sacrum.

Cut 18

Palpation of Sacrum

In cases where there is extreme rotation or extreme muscular atrophy in the lumbar region it may be possible to palpate the transverse processes, but ordinarily this method of procedure is highly impractical for the reason that an adjustment is rarely given upon them.

In the majority of cases where the lumbar vertebrae are rotated it is impossible for the palpator to determine this thru palpation. He must have access to a spinograph equipment to arrive at an accurate conclusion as to the existence of a rotation. If a rotation is present, the adjustment should be given by placing the contact point upon the mamillary process of the vertebra.

Listing of Sacrum. In the listing of the sacrum, two methods are employed. First, a visual examination as to the contour of its posterior surface is made, and secondly, the palpation is made with the fingers of the palpating hand. These fingers are held in a straight line and together at the tips, gliding over the median line from base to apex, comparing the impressions received with the contour of the remaining portions of this primary curve, noting especially the position of the base as compared with the fifth lumbar vertebra. Palpation should then be made from above downward over the lateral portions of the posterior surface, comparing the posteriority of the one side with that of the other and listing the one which is most posterior. If one side is found to be more posterior than the other, the posterior superior spine of the ilium on that side will be less prominent as compared to the base of the sacrum.

The sacrum may be listed in four different directions. It may be that the base is posterior to its normal position, and in such an event it will be listed sacrum-base-posterior (SAC-B-P). If however, the apex is more posterior than the normal, it will be listed sacrum apex posterior (SAC-A-P). If it is found that one side of the base is more posterior than its fellow, the listing will be sacrum-base-posterior on left

(SAC-B on L) sacrum-base-posterior on right (SAC-B on R).

Extreme care must be exercised in determining the exact position of the sacrum. This comparison must be made, keeping continually in mind the general contour of the spine and particularly the contour in the lumbar region. If, for instance, it is determined that there is a lordosis in the lumbar region, one will be almost sure to find a sacrum apex which is posterior. For the same reason if there is a kyphosis in the lumbar region, one will almost be sure to find a sacrum base posterior. However, the sacrum base or apex may either one be posterior without any general curvature being manifest in the lumbar vertebrae. For all general purposes, it may be stated that the tubercles on the several segments of the sacrum should show the same degree of prominence as the spinous process of the fifth lumbar vertebra.

It may also be stated that the sacrum as a solid compact mass not only shows a posteriority of either the base or the apex, but when this occurs it shows a corresponding anteriority of the other end. The Chiropractor, however, is not concerned and should not list the extremity which shows anteriority but should only recognize, in his analysis, the posteriority. This for the reason that the posterior extremity may be readily adjusted while the anteriority cannot be directly adjusted but is eliminated as the posteriority is reduced.

In determining whether or not one side of the sacrum base is more posterior than the other, the comparison is made with the posterior superior spines of the ilii. Normally this comparison shows that the posterior superior spines of the ilii are approximately one-half inch posterior to the posterior surface of the sacrum.

Care should be taken not to confuse abnormalities in the development of the sacrum with abnormal conditions of the sacrum. It is not uncommon to find an acute posterior angle at the junction between the third and fourth or fourth and fifth segments of the sacrum. This condition occurs during

Cut 19

Palpation of Coccyx

development and if one does not exercise extreme caution they will be led to the erroneous conclusion that the apex of the sacrum is anterior, when as a matter of fact, this is not the case. It is very seldom that exostotic growths occur at the articulation between the sacrum and the ilii. When this does exist, however, care should be exercised to get the correct impression of the relationship which exists between the posterior surface of the base and the posterior superior spines of the ilii.

Listing of the Coccyx. Palpation of the coccyx should be made with the three palpating fingers gliding over the median line from its base to its apex and notation made as to any irregularity which may exist at its articulation with the sacrum; also as to whether it lies in the same curved plane with the sacrum. If the apex of the coccyx is posterior as compared with its normal position, it is listed posterior and indicated by the symbol P. If the apex is more anterior than the normal, as is more often found, it is listed anterior and indicated by the symbol A. The palpater should never neglect to palpate the coccyx as it is often the etiological factor of most importance in many incoördinations. Especially is this true in constipation.

Listing of the Ilii. In the listing of the ilii, the posterior superior spines are compared with the posterior surface of the sacrum and it is determined whether their relation is normal or abnormal. This is done by palpating directly over the sacro-iliac articulation and notation made as to their relative positions. Normally, an ilium is approximately one-half inch more posterior than the base of the sacrum opposite which it is found. If it is more posterior than in the normal it is listed posterior and indicated by the letter P.

If a line be drawn between the two posterior superior spines of the ilii, it will fall upon the second tubercle of the sacrum. If upon palpation it is found that this line falls above the posterior spine of the sacrum, one or both of the ilii are superior. Palpation is then made of the sacro-iliac articulation

Cut 20

Palpation to Determine Posteriority of Ilium

and the palpater determines whether one ilium is superior to the other as compared with the base of the sacrum.

Probably the best method for making this measurement is to place the tip of the second finger on the tubercle of the second segment of the sacrum. Then place the first finger upon the posterior superior spine of the ilium opposite the side upon which you are standing and place the tip of the third finger on the posterior superior spine of the ilium toward you. The three fingers should now be in a straight line with each one at the same level. If either the first or third fingers is above the level of the second finger, it will be determined that the ilium on that side is superior. If both of these two fingers are superior to the second it is determined that both ilii are superior.

From the foregoing it can readily be seen that there are two directions in which the ilii may be subluxated. They may be subluxated only to the posterior, in which event they are listed by the symbol P. Again they may not only be posterior but also superior, in which event they are indicated by the symbol PS.

Cut 21

Palpation to Determine Whether or Not the Ilium is Superior

SECTION II.

ADJUSTING

Chiropractic is based upon the fact that disease is caused by the constriction of nerve fibers and as subluxations of the spine occlude to a greater or less degree, the intervertebral foramen, the Chiropractor naturally turns his attention to the correcting of the subluxation, thus restoring the intervertebral foramen to normal size and relieving the existing impingement. Upon the correcting of the subluxation then depends the condition of the patient that comes to him suffering from any physical ailment. Upon so important a matter as the adjusting of a subluxation, no pains or efforts should be spared and the practitioner should exert all of his powers in making himself proficient in this all important branch of our science. It makes no difference how much he may know regarding the symptoms of disease; how expert he may be in determining the causative subluxations; if he is not thoroughly equipped to correct this cause, the end which he wishes to obtain cannot be accomplished.

The master of his subject, whether his station be high or low, his success important or immaterial to the world at large, must be thoroughly equipped with the knowledge of detail in his particular line of endeavor.

The musician before he is enabled to render the masterpiece, must have spent hours upon hours of tedious toil and earnest endeavor in order that his execution may display the finest quality of technique. Before the Chiropractor can reach that point where his adjusting is accomplished with the greatest ease to himself and the least pain to his patient, he must spend much time and concentrate his attention closely upon mastering the detail of each individual step, so that finally, the adjustment may be given specifically and ac-

curately without undue attention being given to the finer and more minute details.

In order then that the Chiropractor may arrive at a degree of proficiency in his art which will enable him to give the best possible service to his patients, he must go over time after time the minute details which will ultimately lead up to a proficient execution of the adjusting move. This will mean hours of drill, accompanied by the very closest attention, but when the final result is shown it will be found that every minute has been profitably spent. The Chiropractor should gain that degree of proficiency that when he is actually delivering an adjustment the minute details of his technique will be so firmly implanted in his mind that he will not find it necessary to stop and consider whether or not he is using the correct method. In brief, he will unconsciously follow the correct procedure and by doing this time after time it becomes purely automatic and he will need have no fear of assuming the wrong position.

In order that the student may comprehend the various positions which are used in giving adjustment, definite drills have been incorporated in the following pages and special attention to the details of the various positions used. To these details too much attention cannot be given. The adjuster should make the various positions so much a part of himself that their attainment becomes subjective.

THE PALMER RECOIL

The Palmer Recoil is a method of specific vertebral adjusting whereby the subluxated vertebra is restored to its proper position by the certain application of force upon it with the hands, utilizing the natural elasticity and resistance in the spine of the patient. We will here take up several general considerations associated with the recoil adjustments which are of the most importance. They are relaxation, concentration and speed.

Relaxation is applicable equally to the Chiropractor and the patient. To the latter because less resistance is offered to the adjustment and less force required in restoring the vertebra to its proper position; to the former that pounding may be prevented and that a maximum speed may be obtained. There is no question but that if the muscles of the arm and shoulder of the adjuster are contracted either speed will be lost or pounding results. This is for the reason that the hands are in contact with the spine of the patient and with the muscles contracted there is no play in them. This gives rise to a tendency on the adjuster's part to raise his contact from the back and thus start the downward movement with some degree of momentum. If he does not do this he starts the adjusting move with no momentum whatever and must necessarily lose a certain degree of speed. This speed is lost because just as soon as the muscles start to contract they meet the resistance of the vertebra under the nail point. From this time on to the completion of the adjusting move, the adjuster finds that a great deal of muscular effort is required to straighten the arm and actually deliver the adjustment.

If, on the other hand the muscles in the arms of the adjuster are thoroughly relaxed when the adjusting move is begun, a certain degree of momentum is attained by taking up the slack in the muscles. Thus the downward thrust is actually started before any force is delivered to the contact point.

This question of relaxation is one of the most difficult for the beginner and even many adjusters of experience find it hard to relax the muscles of the arms and shoulders thoroughly. This seems to be due very largely to a mental attitude on the part of the adjuster. If his hands are placed on the back of the patient and if he can succeed in absolutely forgetting that his nail point rests upon the patient's back, he can relax thoroughly. As soon, however, as he allows himself to concentrate upon the fact that he must deliver an adjustment, his arms immediately begin to tense. For this rea-

son it is well for the adjuster, when he gets his contact on the vertebra to give his attention entirely to the thought of relaxation. Let the arms hang absolutely loose from the shoulders so that they can be swung if necessary from side to side. Just as soon as the idea of giving the adjustment enters the mind, the adjusting move should be given by snapping the elbows together.

Perhaps one great reason for the tendency to contract the muscles of the arms and shoulders just before an adjustment is delivered is the fact that the adjuster attempts to hold his contact too tightly on the spine of the patient. As a matter of fact, the weight of the arm resting upon the patient's spine gives all the pressure that is necessary to maintain the nail point in the proper position. Naturally if more pressure than this is applied, there will have to be more or less contraction of the muscles in order to produce it. There is perhaps no better way to implant the idea of how the adjusting move should be delivered than to use the word "spasmodic." Almost everyone has had the experience of having a chill. Here we have a very excellent example of a spasmodic contraction of muscle fibres. This contraction takes place very rapidly and is an alternate contraction and relaxation. If one can thoroughly implant in his mind to relax the arms and shoulders thoroughly and then to produce a spasmodic contraction of the muscles to extend the arms and if he can make this contraction a distinctly spasmodic one, he will immediately get the idea of how the adjustment is delivered.

Concentration applies both to the mental attitude and physical execution of the adjuster. Every faculty of the mind should be turned to the matter in hand and every step of the procedure should be carefully considered. This means that the position of the adjuster, the direction of his force, the degree of force, the relaxation of the patient and adjuster and the speed must all be carefully considered and ever kept in mind. The adjuster also should note carefully the various points which will lead to the perfect concentration of his force.

upon the point of contact. The beginner is all too apt to allow his shoulders to be thrown upward by the force which should be applied to the vertebrae being adjusted, or to place his hands in such a way that much force is dissipated over the surface of the back upon which his fingers are braced.

Mental concentration is not less important than physical concentration upon the vertebrae to be adjusted. In order to obtain the best possible results the adjuster must first thoroughly concentrate his mind upon the matter in hand and he must bend every faculty to the end of delivering the maximum amount of speed and force required. Every time an adjustment is given the adjuster should stop and think, after he places his hands and arms in the proper positions, of speed. The execution of any act is first the result of a thought in the mind and no person can properly develop the required speed in delivering an adjustment until he first thinks speed at the time of delivery. There is perhaps no better thought to keep in mind than that embodied by the word "spasmodic." An adjustment is just that; a spasmodic contraction of the muscles of the arms and shoulders from a relaxed condition to a high degree of tension, and as sudden relaxation of those muscles after the adjustment has been delivered.

The relaxation of the arms, shoulders, hands and wrists after the delivery of the actual adjusting force is just as essential in the development of an accurate technique as is the contraction itself. In brief, it is this sudden relaxation following the actual delivery of the adjusting move which gives to the adjustment the name of recoil. It is, in fact, a recoiling of the arms after a sudden spasmodic contraction.

Speed is an absolute essential to the recoil adjustment and its importance cannot be brought home too forcibly to that practitioner who expects to attain the greatest results in the shortest possible time. In fact, the consideration of speed should not be confined alone to the recoil but it is of vital importance to every method which has for its purpose the

adjusting of vertebral subluxations. It is important for two reasons, viz: it does not allow time for the patient to contract the muscles of his back during the application of force and thus resist the adjustment. Again, the greater the speed used the less probability there is of the applied force moving adjacent vertebrae because speed overcomes friction. This is illustrated by the example of an ordinary card placed between two books. The card may be removed by quickly jerking it without changing the relative positions of the two books, but if pulled slowly the top book will be drawn with it.

The greatest degree of speed can only be attained by strict attention being given to the proper relaxation in the arms and shoulders. To that man who has had the experience of boxing, it is a known fact that a blow is much more effectively delivered if it is started from a relaxed condition. If the body is tense, a certain amount of lost emotion is consumed in starting to deliver the blow, but if the muscles are thoroughly relaxed the movement is actually started by the taking up of the slack in those relaxed muscles.

Too much emphasis cannot be laid upon the necessity for speed in the delivery of a proper recoil adjustment. However, it must be remembered that this is not a physical action alone but that the physical action is dependent upon the mental attitude which must first express speed. It has been the good fortune of the writer to have taught the art of adjusting to thousands of students. One of the greatest difficulties for the beginner to overcome is the tendency to deliver an adjustment slowly and thus not utilize the full effectiveness of his muscular contraction. Experience has taught that if the idea of speed is once firmly implanted in the mind of the adjuster and if he will but give it sufficient attention, he can undoubtedly increase the effectiveness of an adjustment which may already be fairly good. It is questionable if any individual has ever reached the maximum possibility of speed in the delivery of an adjustment. No matter how successful

Cut 22

Five Point Drill—Count One

one may have been in developing a high speed, there is always room for improvements in this important phase.

The recoil may best be learned by concentrating the attention in the beginning to the mastering of detail in the position, direction and movement, thus making them subjective in order that they may be used during the actual adjustment without undue attention being given to their execution. To facilitate this accomplishment certain drills have been devised which will be explained in the order they should be learned.

ADJUSTING DRILLS

Five-Point Drill. The hand which is placed upon the back is known as the nail hand and its position is attained by the following drill:

One. Place the palms of the hands evenly together.

Two. Flex the wrists, thus separating the palms with the exception of the heels of the hands, which should be held closely together. Also flex the hands at the metacarpal-phalangeal joints, thus leaving the tips of all the fingers together. The thumbs in this position should not be brought together but should be held extended as far as possible. Care should be taken to see that the flexion involves only the metacarpal-phalangeal joints and that the fingers otherwise are held straight.

Three. Keeping the tips of all four fingers in contact with the tips of the fingers of the opposite hand, spread them out in a fan-like formation so that the fingers of the same hands are as far apart as possible. Care should be taken on this count to see that the fingers are still held straight and that no bend occurs in them below the metacarpal-phalangeal joint.

Now keep the tips of the fingers together and spread the heels of the hands apart with the exception of the pisiform contact. Here also care should be taken to see that the fingers are not bent. This is more difficult on this count than on any other because the spreading of the heel of the hands necessitates a greater bend at the metacarpal-phalangeal joint of the first finger than has existed on any preceding count.

Cut 23

Five Point Drill—Count Two

Cut 24

Five Point Drill—Count Three

Four. Keeping each hand in the same relative position with the forearm, turn them palm down so that the plane formed by the tips of the fingers and the pisiform bone is parallel to the floor. This gives us the position of the nail hand in both the left and right, and does not imply that both are used as such in giving the adjusting move. It is merely used as a drill to assist the student through the various stages of progression to assume the correct position of the nail hand and to become equally proficient with either.

Five. Return the hands to the same positions which they occupied at the end of count three and it can be thus determined whether or not the fingers and hands have retained the same relative positions on count four.

Probably one of the most common errors made in delivering an adjustment is in assuming an incorrect position of the nail hand. These mistakes are made in various ways. The most common is that of neglecting to flex the wrist back to the greatest possible degree. If this is not done, the wrist cannot be held rigid and when an adjustment is delivered much of the force is lost by the wrist breaking down and allowing the entire heel of the hand to come in contact with the spine.

With the hand in this position that part of the pisiform bone which comes in contact with the back of the patient is known as nail point one. The part which is midway between the metacarpal-phalangeal joint of the small finger and the pisiform bone is called nail point two, and is used in adjusting cervical vertebrae with the exception of the sixth and seventh.

Nail Point One. A great deal of confusion seems to exist in the minds of adjusters as to exactly what part of the pisiform bone becomes the nail point. It may be stated that if the hand is held parallel to the forearm the proper contact cannot be felt at all. It is only when the hand is flexed backward at the wrist that nail point one is exposed. It is that surface of the pisiform bone toward the small finger, and this same contact is the nail point whether the adjuster is

Cut 25

Five-Point Drill—Count Four

Cut 26

Five-Point Drill—Count Five

Cut 27

Nail Point One

standing on the same side as the subluxation or whether he is standing on the opposite side to which the vertebra is subluxated. In either event, the tip of the pisiform bone extends toward the side on which the adjuster is standing.

It is well to keep in mind that on count number four in this drill the fingers are pointed away from the body of the adjuster and that the elbows are held well out from the body with the forearm flexed at an angle of 140 degrees.

Nail Point Two. We have already stated that nail point two is found midway between the pisiform bone and the metacarpal-phalangeal joint of the small finger. This contact, however, is partly through the heavy muscle on the palmar surface of the hand and not back on the margin of the hand. This muscle acts as a cushion between the cervical vertebra of the patient and the osseous structure of the adjuster's hand. If the nail hand is held so that the palmar surface is not dropped toward the surface of the patient's neck the contact is made directly on the bony structures of the hand and this is improper for two reasons. First, because of the possibility of bruising the muscle on the patient's neck when the adjustment is delivered. Second, because it precludes the possibility of flexing the hand backward at the wrist and making the wrist rigid. It is largely on the rigidity of the wrist that the delivery of the full force of the adjustment is dependent. If this is not done, there is every possibility of the contact upon the vertebra changing when the force of the adjustment is delivered.

A short drill is sometimes used to facilitate the rapid assuming of the position of the nail hand. It is accomplished by placing the hand prone upon a flat surface, then quickly flexing the fingers at the metacarpal-phalangeal joint and drawing the thumb backward and upward so that the hand assumes the same position as at the conclusion of the five-point drill. In the correct position, the nail hand should be placed so that a pencil may be passed between the surface upon which it rests and the metacarpal-phalangeal joint of the

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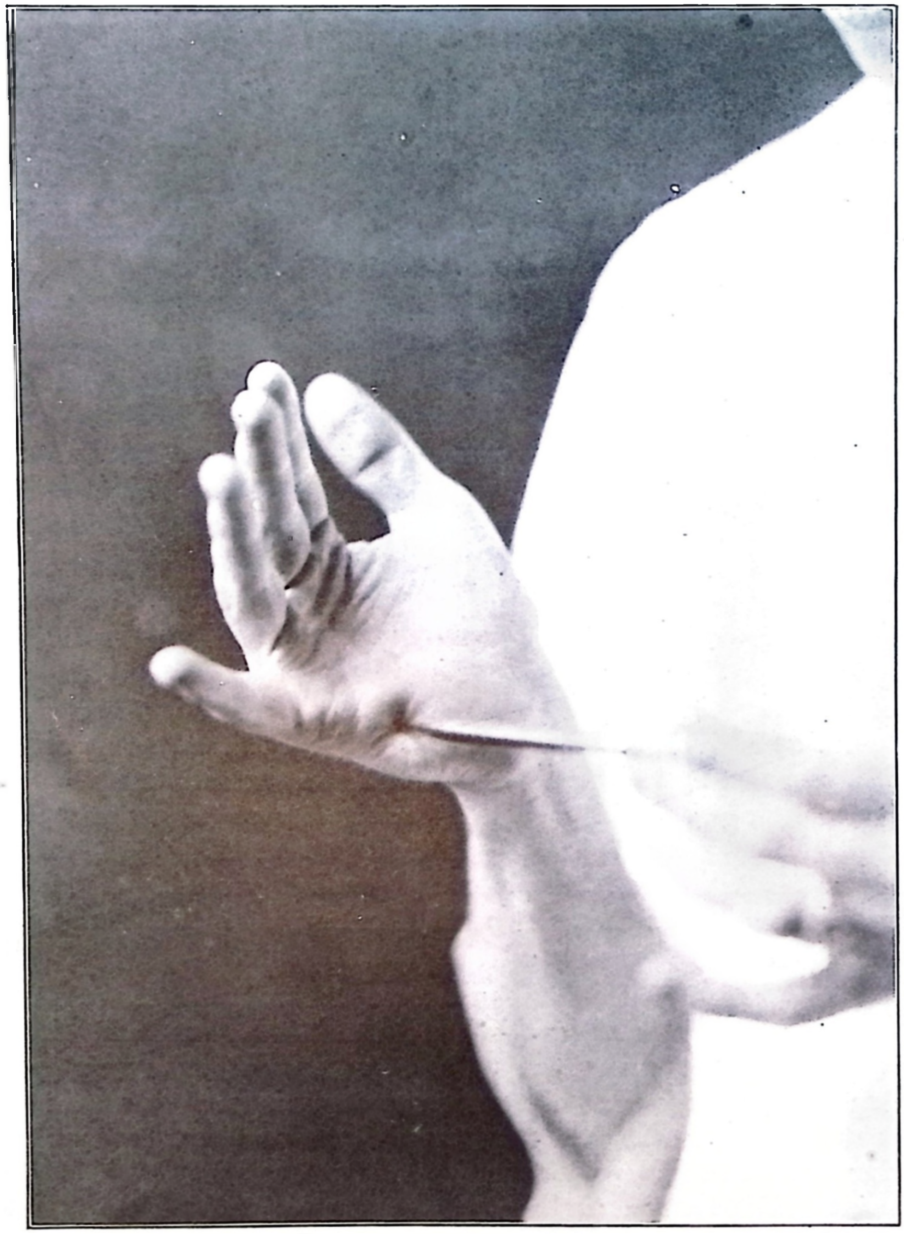

Nail Point Two

Cut 29

Correct Position of Nail Hand

small finger. When the student becomes familiar with this drill, he should apply it without the use of a flat surface upon which to rest the hand. Leaning slightly forward he should quickly assume the correct position and then take every care to see that the tips of the four fingers and the pisiform bone are all in the same plane and parallel to the surface of the floor.

Three Point Drill. This is a drill which is designated to accustom the adjuster to the correct position of the hand and arms and the proper manner in which to stand while giving an adjustment.

The feet should be placed about fifteen inches apart, the legs straight and the body flexed forward so that the nail hand is held about twenty inches from the floor. The nail hand should be held as described in the five point drill, with an arch at the metacarpal-phalangeal joints and with the hand flexed well back so that the wrist is rigid. The thumb should be raised and the fingers held straight so that their tips are on the same level with the pisiform bone of that hand. The arm should be bent at the elbow so that the forearm forms an agle of about 140 degrees with the upper arm.

A common error is an incorrect position of the elbows. In order to place the elbows in the proper position the adjuster should form an imaginary plane passing through the two shoulder joints and the pisiform bone of the nail hand. The elbows should now be placed in this plane. In this manner the drive is given directly downward from the shoulders and there is no tendency to apply the force in such a manner that it will either be driven away from the body of the adjuster or back toward his body. The tendency to error in assuming the position with the elbows is to allow them to remain too close to the hips of the adjuster and thus the drive is delivered away from his body rather than straight down from the shoulders as it should be. This point should be noted very carefully and extreme care exercised to see that the force, when it is applied, comes directly from the shoulders and equally from both of them.

Cut 30

Three-Point Drill—Count One

One. Assume the correct standing position as here described with the nail hand and arm properly placed. In this drill it is best not to have the nail hand in contact with the surface of any object. It should be allowed free movement so that when the muscles of the arm are contracted and the elbows are snapped together, there will be no interference offered to the movement.

Two. Place the hammer hand. In explanation we may say that hand which is not used as the nail hand automatically becomes the hammer hand. This hammer hand merely grasps the wrist of the nail hand with its pisiform bone placed in the depression which is made by the flexing of the nail hand backward and the raising of the thumb. The hammer hand should be placed in its correct position with an angle at the elbow equal to that at the elbow of the nail hand. Care should be taken to see that the fingers and thumb of the hammer had are on opposite sides of the nail hand wrist. The fingers of the hammer hand should be placed in such a manner that they extend straight around the wrist and should not be extended obliquely toward the elbow. This is done for the purpose of eliminating any cramping of the wrist when the adjusting move is given. All the muscles of the arms and shoulders should at this time be thoroughly relaxed. Too much care cannot be given to this relaxation as it is one of the vital points in the delivery of an effective adjustment.

After the placing of the hammer hand in the second count, the student should turn his entire attention to the matter of relaxation, seeing that the arms of both the nail hand and the hammer hand are swinging free with every muscle thoroughly relaxed. The tendency is to contract the muscles of the upper arm and this produces more or less tension thruout the entire arm. As has been stated before, the giving of an effective adjustment is very largely the result of a proper mental attitude and in this particular instance the entire attention should be turned to the matter of relaxation.

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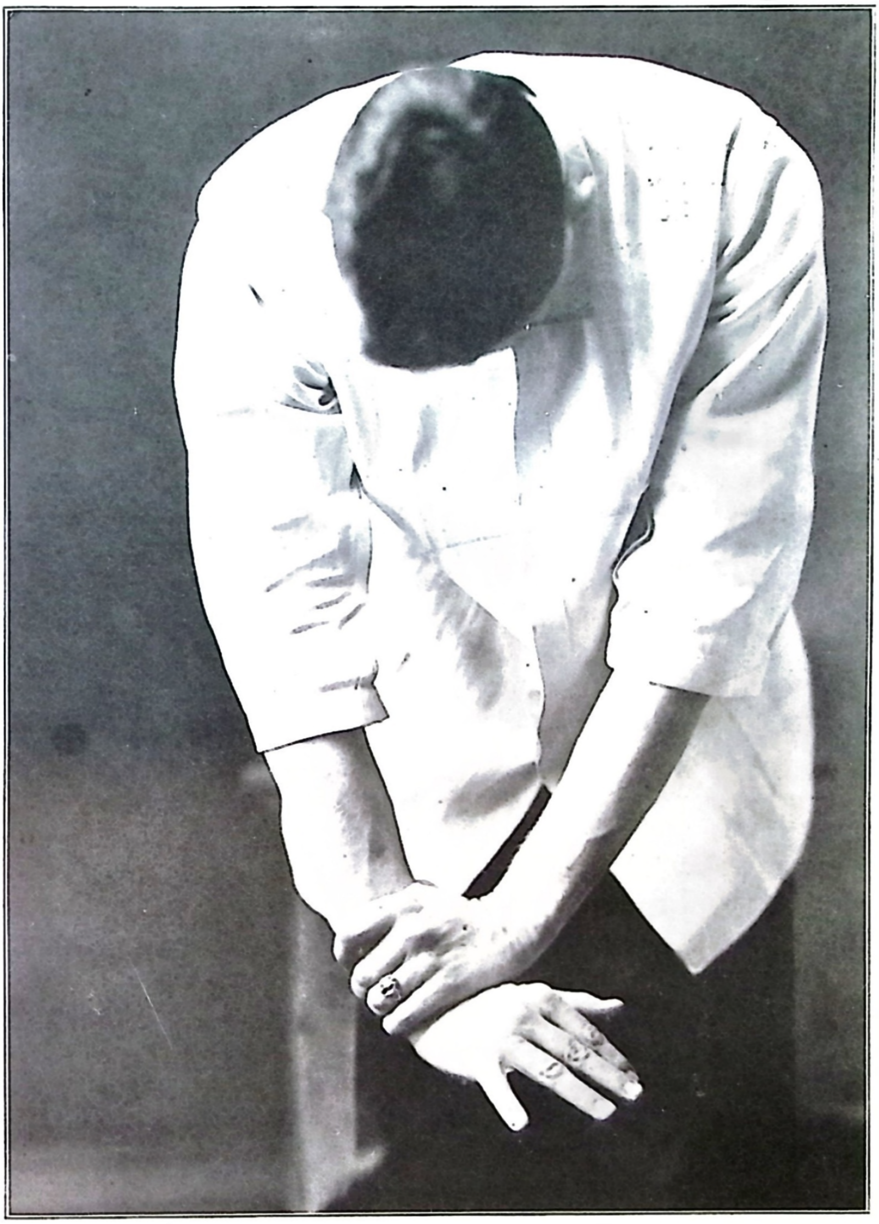

Three-Point Drill—Count Two

The nail point should be directly below the episternal notch and the adjuster is now ready for count number three.

Three. Give the adjusting move. This is done by bringing the elbows together with a quick snappy contraction of the extensor muscles of the arm; also by a sharp contraction of the pectoralis muscles which serve to draw the upper arm toward the chest. This combined action suddenly forces the nail point downward and during the action the shoulders should be held at the same level. In other words, the shoulders should at all times during this drill be kept at a given distance from the floor and should not be raised when the adjusting move is delivered.

This drill should be repeated time after time in order that the adjuster may learn to assume the proper position quickly and easily and also that he may develop the greatest possible speed. After it has been determined that the position is correct on count two, and the proper relaxation has been produced, then every attention of the adjuster should be turned toward making the action of the arms a spasmodic contraction and thus developing the greatest possible speed. It would be found that by continuous exercise in this manner, the ability of the adjuster to produce a quick, snappy action of the arms is materially increased.

It should not be lost sight of that this is a rudimentary exercise in learning to deliver a proper recoil adjustment, and as the name implies, this action is truly a recoil. For this reason the adjuster should give as careful attention to relaxing the arms after the adjusting move is delivered as he does to the actual delivering of the adjustment.

An exercise to develop relaxation and speed. A simple exercise has been devised for the purpose of developing the two all essential qualities of relaxation and speed in the delivery of an adjustment.

The adjuster should lean well forward so that the arms when relaxed hang free from the body. Now flex the arms so that there is an angle of approximately 140° at the elbows

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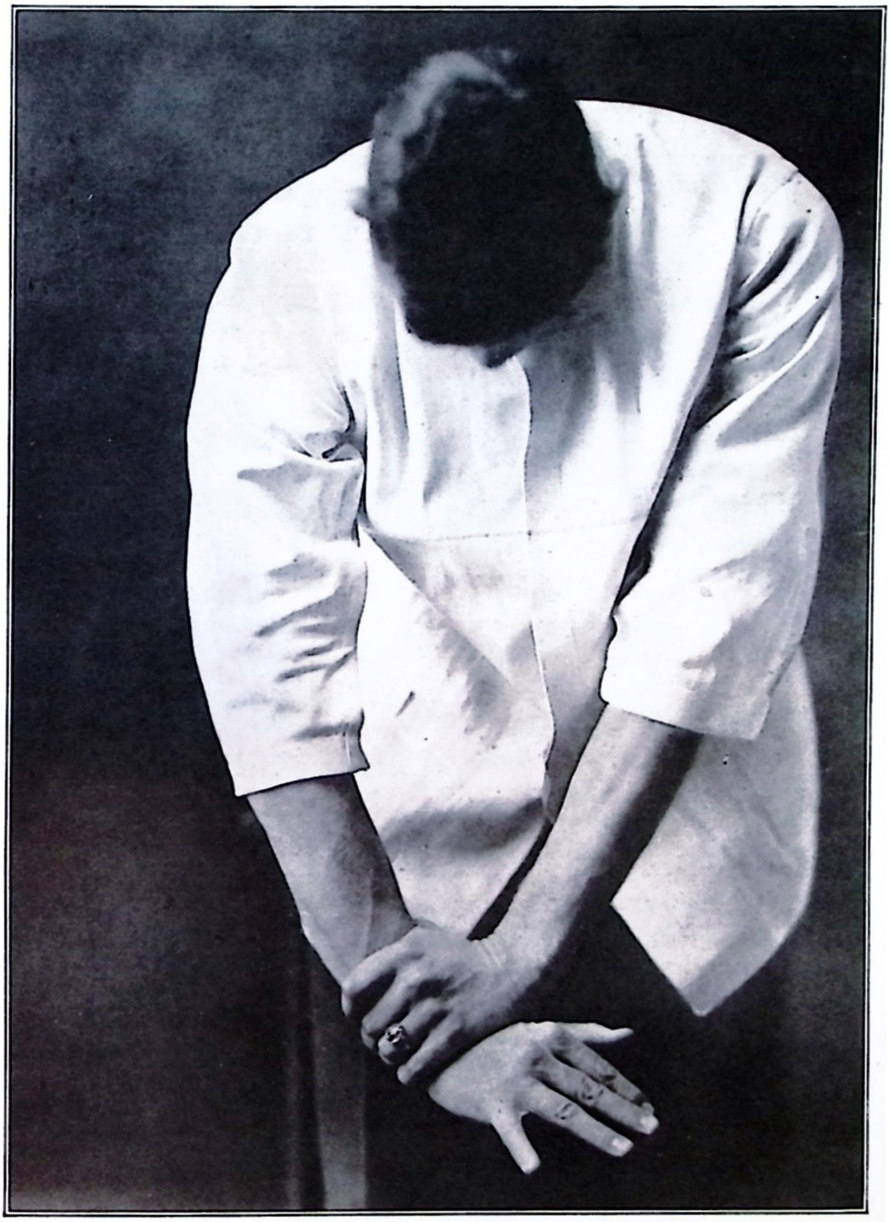


Three Point Drill—Count Three

and relax them as thoroughly as possible. At this point in the exercise the student should give his attention solely to a thorough relaxation. The shoulder joint should now admit a movement in any direction as should also the elbow and the wrist joints. When the proper relaxation is attained the elbows should be suddenly straightened. No attention should be paid to either the shoulders or the wrists, but it should be continually kept in mind that the contraction must be a spasmodic one. Possibly one of the greatest errors in this drill is the inability of the student at first to produce a spasmodic contraction and consequently a spasmodic extension of the arms. It will be found however, by strict attention to a proper relaxation and by continued effort in producing a sharp, quick contraction that the speed will be materially increased and the student himself will be surprised at the speed attained.

Another common error is the tendency of the student to draw the hands sharply upward just before straightening the arms at the elbows. This is essentially the result of an improper relaxation and in order to overcome it the adjuster should fix his mind solely upon producing an extension of the arms not preceding this extension by a flexion of the elbows. This drill is best accomplished by counting one for the relaxation and then upon the count of two, spasmodically extending the arms.

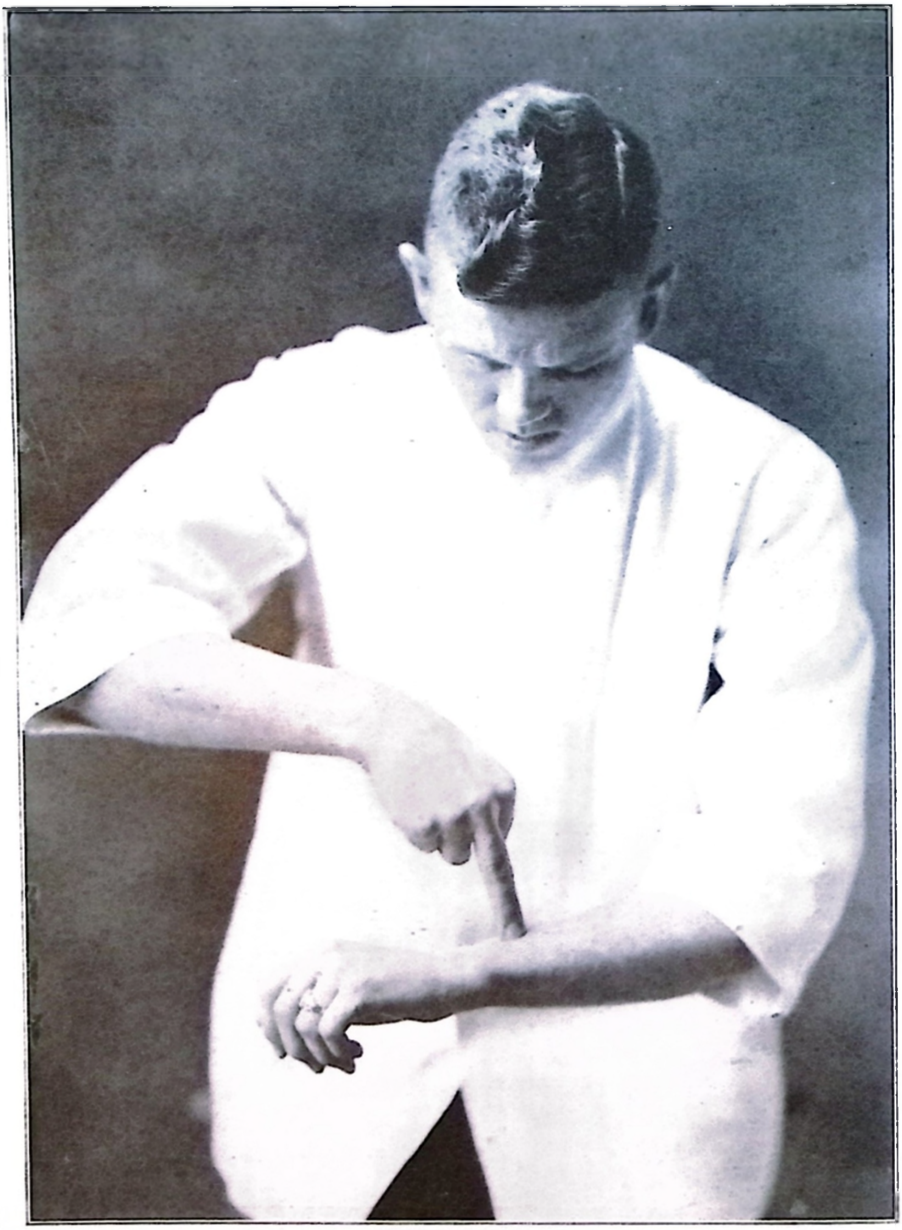
Seven point drill. This is a drill designated for the purpose of carrying the adjuster through all the various steps incident to giving a recoil adjustment. The adjuster should provide himself with a smooth surface eighteen to twenty inches in height which is springy, as the edge of a couch or the seat of an upholstered chair. A position then should be assumed facing the apparatus and using either hand as the palpating hand. It is well to alternate palpating hands so that an equal amount of practice may be accomplished with either hand as the nail hand.

One. Palpate and locate the imaginary point. Care should be taken on this count to see that the three fingers of

Cut 33

Seven-Point Drill—Count One

Cut 34



Seven Point Drill—Count Two

Cut 35

Seven-Point Drill—Count Three

the palpating hand are evenly placed and together. The palpation should be made with the small finger leading as this is the procedure which is followed in giving an actual adjustment upon the spine of the patient. Care should also be taken not to press too heavily upon the surface as this part of the drill can be utilized in developing the sense of touch if due consideration is given to that phase during the count of one. Having arrived at a suitable point on the apparatus for the placing of the nail hand, we are ready for count two.

Two. Remove the first and third fingers. On this count the student should take particular pains to see that the first and third fingers are flexed so that they lie in the palm of the hand and thus are entirely removed from the surface upon which he is working. This is a small matter of detail and yet it is important when the student finally arrives at the point where he is actually working upon the spine of a patient. This is for the reason that if the first and third fingers are not properly removed they are more or less in the way when the adjuster places the nail point. This may lead to serious error when the adjuster is actually working upon the spine of a patient because at this time it is absolutely essential that the nail point be placed at the tip of the second finger and it is upon the proper placing of this nail point that much of the success in delivering an adjustment is dependent.

Three. Lower the palpating hand. This is done by dropping the palpating hand with the palm as near the surface of the apparatus as is possible with the fingers folded into the palm. If this is not done, more or less interference is given to the placing of the nail hand by the fact that the palpating hand is directly above the point of contact and not only offers itself as an obstruction to the nail point but does not permit the adjuster to use the visual sense as an assistant in the placing of the nail hand upon the proper contact.

Four. Place the nail point. The nail point, as has been stated before, is that surface of the pisiform bone which is already exposed when the nail hand is flexed backward at the

Cut 36

Seven-Point Drill—Count Four

wrist. Too many adjusters have the idea that the apex of the pisiform bone constitutes the nail point. This leads to error especially when they are placing this contact on the side of the vertebra opposite to that on which they are standing. In correctly placing the nail point, whether one proposes to drive the vertebra away from himself or toward himself, the apex of the pisiform bone is allowed to project toward the side on which he is standing.

Every care should be taken on this count to see that the fingers are properly spread out and that in general the nail hand is held in its proper position. It should be remembered that the fingers are held straight with only the pisiform bone of the nail hand and the tips of the four fingers in contact with the surface. This is easily accomplished if there is only a flexion at the wrist and at the metacarpal-phalangeal joints. Care should also be taken to see that the thumb is held up so that a distinct depression is formed at the angle between the thumb and the forearm. Thus, the pisiform bone of the hammer hand can be properly placed in the groove which is thus formed and when the fingers of the hammer hand grasp the wrist it eliminates the possibility of slipping. The elbow should be closely watched to see that it is thrown out and away from the hips and in line with the plane formed by the pisiform bone and the two shoulder joints.

Five. Remove the pointer finger. If the nail point is properly placed at the very tip of the pointer finger it is found that the apex of the pisiform bone comes down on the finger nail. This brings the actual contact surface of the pisiform directly above the very tip of the finger as it is placed upon the surface. Undue pressure should not be placed upon that finger nail. Rather, when the apex of the pisiform bone comes in contact with it, the pointer finger should be removed allowing the contact point to settle down on the indicated surface at the same point which was but recently occupied by the tip of the pointer finger. After this is accomplished the adjuster should note the degree of pressure which is being applied to

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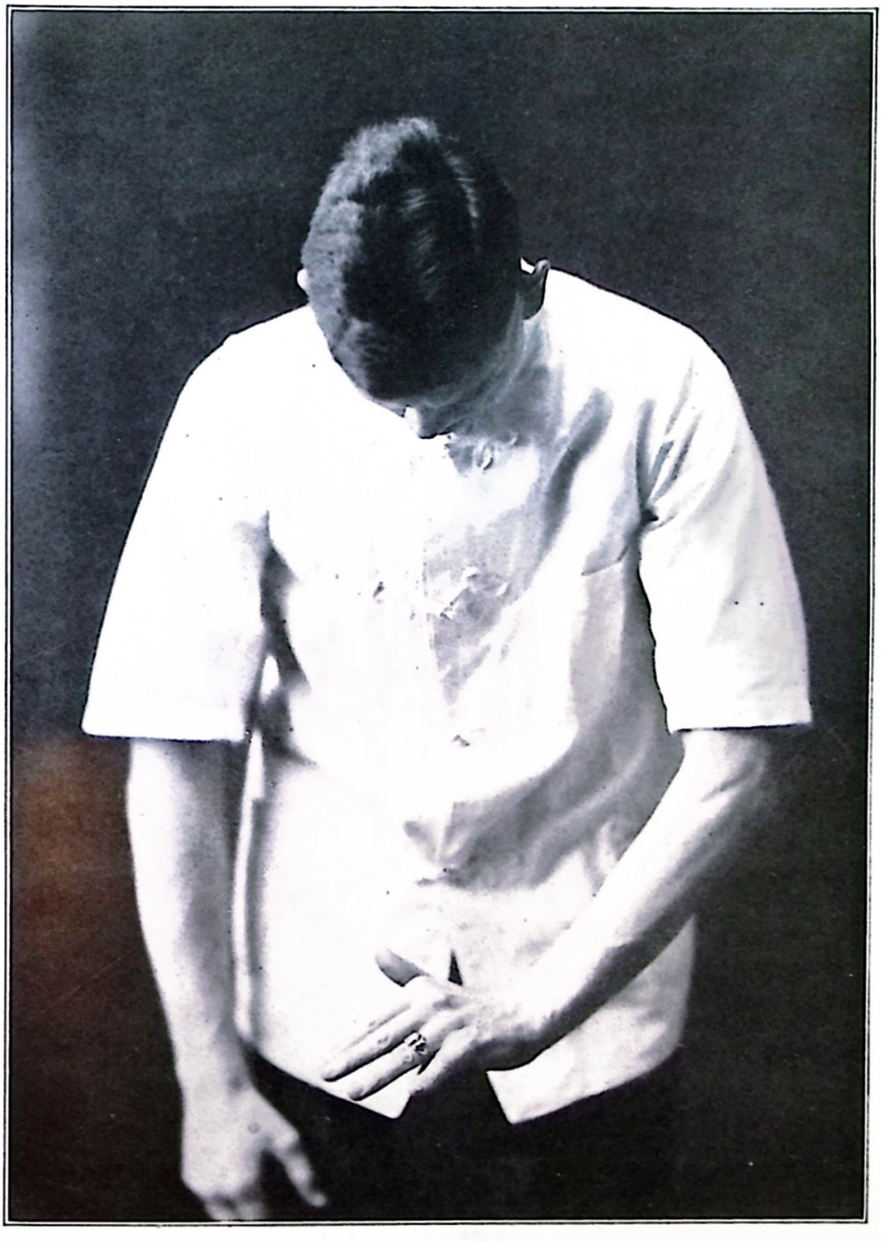

Seven-Point Drill—Count Five

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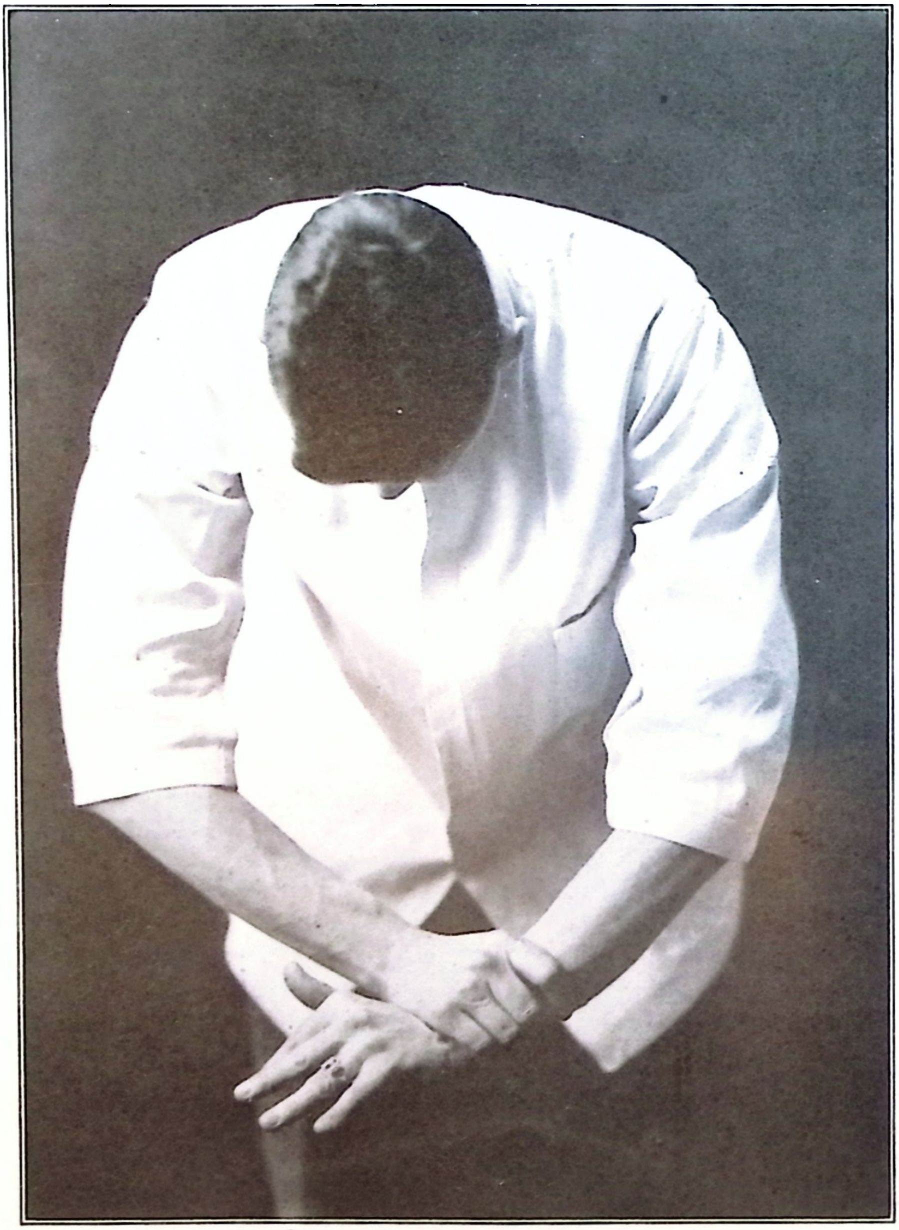


Seven-Point Drill—Count Six

the surface upon which he is working. This pressure should constitute only the weight of the arms as it is only in this manner that a proper relaxation can be arrived at.

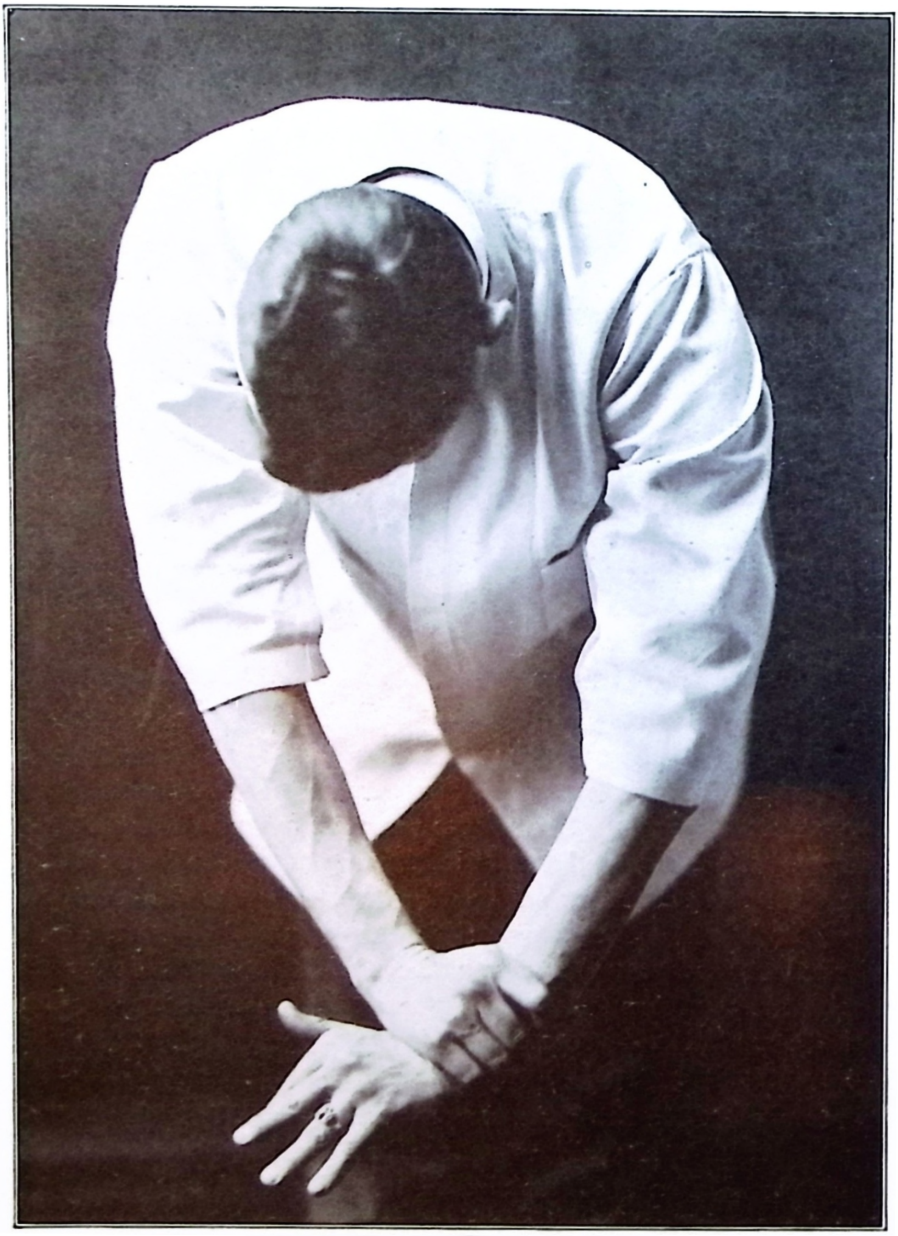
Probably the one thing which causes adjusters to contract the muscles of the arms more than any other one thing is the fact that the nail point is pressed too firmly upon the surface of the back. This seems to be the result of a fear on the part of the adjuster that he will lose the contact point. This however, is not true if the nail point is properly placed and the weight of the arms will give all the pressure that is necessary in maintaining the proper contact.

Six. Place the hammer hand. The palpating hand now becomes the hammer hand and is placed so that the pisiform bone fits snugly into the depression formed by the proper arching of the nail hand. The fingers and thumb should now encircle the wrist of the nail hand with the fingers around the dorsal surface of the wrist and the thumb on the opposite side. The wrist of the nail hand should be grasped firmly but should not be gripped to such an extent that an undue tension is produced in the muscles of that arm.

Care should be taken to see that the elbow of the hammer hand is also bent at an angle of approximately 140° like the elbow of the nail hand. Care should also be taken to see that the elbow of the hammer hand is held away from the hips and in line with the plane formed by the pisiform bone and the two shoulder joints. In this way the adjuster may be assured that when the elbows are drawn together the force will be delivered straight away from the shoulders, and by the combined action of both arms the force of the drive will extend directly from the episternal notch to the pisiform bone.

Seven. Give the adjusting move. This is done by drawing the elbows sharply together thus forcing the nail point downward. The adjuster should keep in mind only the fact that he is delivering the adjustment toward the floor and should entirely lose sight of any laterality which he might be trying to imagine existed on the surface being adjusted. Too

Cut 39



Seven-Point Drill—Count Seven

often the adjuster is prone to push the nail hand away from him or toward him in attempting to more efficiently give some direction other than posteriority to the vertebra. He should ever bear in mind that this laterality, superiority or inferiority is taken care of by the proper leaning position, and that as soon as this leaning position is assumed he should lose sight of everything except to deliver his force straight downward from the shoulders.

In this count it is essential to note a proper relaxation before the adjusting move is delivered, to deliver the maximum amount of speed when the elbows are drawn together and to thoroughly relax the arms immediately after the contraction has taken place.

The seven steps as here described should be followed in the adjusting of every vertebra and the drills should be practiced time after time so that the adjuster may accustom himself to them and will not need to give them undue attention when actually working upon the spine of the patient.

The drills described above are used for the purpose of giving the adjuster an idea of the general principles involved in the recoil adjustment and it should not be inferred that the positions are the same in adjusting all regions of the spine. It shall be the purpose in the following pages to dwell in detail upon the individual positions used in adjusting each vertebra.

GENERAL CONSIDERATIONS.

There are many considerations which are of general importance and are applicable to the adjusting move as delivered in all parts of the spine. We will here concern ourselves with some of the broader phases of adjusting, pointing out certain weaknesses which are more or less common to all adjusters and outlining a general plan of procedure whereby these weaknesses may be overcome.

Contact of nail point one from the second dorsal to the third lumbar vertebrae inclusive. One of the most common difficulties is that of correctly placing the contact point upon

the part of the vertebra where the force is intended to be delivered. This is partly due to a failure on the part of the student to realize exactly where the contact surface of the pisiform bone is and in part upon his failure to locate the correct surface to be adjusted.

If the spinous process is the contact point then the pisiform bone should be placed upon that surface of the spinous process tip which is indicated by the subluxation. In brief, if the subluxation is PR, the adjuster should exercise great care in locating the right border of the tip of the spinous process. In this way, he is able to deliver his adjustment from the posterior and from the right without fear of his contact point slipping off from the vertebra in question. If the subluxation listed is a PLS he should exercise extreme care to see that he locates the left and superior border of the spinous process in order that when his force is delivered his pisiform bone may remain firmly in position and not slip across the process.

A common error, particularly in the dorsal and lumbar regions is to set the entire pisiform bone on the opposite side of the spinous process tip if the vertebra is to be adjusted back toward the side on which the adjuster is standing. This is incorrect. The adjuster should place only the contact point of the pisiform bone on the opposite border of the spinous process, leaving the apex to project toward the side on which he is standing.

Probably another common cause of an incorrect contact is the tendency of the beginner to turn the fingers of the nail hand back toward the side on which he is standing. This should never be done. The little finger should always point in a general way in line with the subluxation.

The beginner often makes the mistake of trying to watch the nail point as it is being placed in contact with the vertebra. Thus he allows the fingers to be pointed more nearly in line with the alignment of the spine than in line with the subluxation. This error also tends to reduce the angle formed be-

tween the dorsal surface of the hand and the dorsal surface of the wrist so that instead of the wrist being held in a rigid position it is more or less relaxed and allows for a distribution of force by the dropping of the nail hand or a loss of contact by the rolling of the nail hand at the exact instant when the force of the adjustment is delivered.

Adjusters sometimes find that the contact point will slip upon the back when the adjustment is delivered. This may be for several reasons. First, it is a common fault not to get the tips of the fingers of the palpating hand firmly placed upon the back. Thus there is no brace or anchorage offered and the pisiform bone has every tendency to slip when this occurs.

Another reason for slipping is the anxiety of the adjuster to deliver his force from the direction in which the vertebra is subluxated. He forgets that the direction is entirely taken care of by his leaning position and as a consequence he either pulls his nail point toward him or pushes it away from him at the time of the delivery of the adjustment. This should never be done. After having assumed the proper leaning position the adjuster should realize that this will completely take care of all directions and he should then deliver his force with a straight downward thrust so that it will come directly from the episternal notch.

Another reason for slipping lies in the fact that the adjuster does not put the proper tension on the skin over the spinous process to be adjusted. In a general way it may be stated that the loose skin should always be pulled toward the adjuster and that in the placing of the nail hand the fingers should take up all the slack between the actual point of contact and their final resting place. In this way, the fingers offer themselves more adequately as a firm brace in sustaining the contact point in its proper position.

Another common error which tends to produce slipping upon the back of a patient is the tendency of the adjuster to lean too far in the direction indicated by the subluxation. It

may be said in a general way that the majority of vertebrae are subluxated principally toward the posterior and that any additional directions are entirely minor in degree. For this reason the adjuster should lean only slightly to the right, left, superior or inferior as the case may be.

The failure of the student to take into consideration the general contour of the spine and particularly the contour in that part of the spine where he is making his contact is another reason for the tendency to slip. This failure gives rise to an exaggeration of the leaning position as is evidenced in the lower dorsal vertebrae when the adjuster places his nail point in contact with a vertebra which is subluxated toward the superior. Here, in order to gain the proper superiority, he leans in such a way that the episternal notch is superior to the point of contact. In other words, he is directing his drive downward and toward the inferior as compared with the surface of the floor. He should, as the first consideration, draw an imaginary line perpendicular to the surface of the back where his nail point is in contact and then lean in such a manner that the force of the adjustment will be delivered in a line superior to the perpendicular as compared with the surface of the back, rather than the perpendicular to the floor.

Contact of nail point one where the nail hands are reversed. Upon the sixth and seventh cervical vertebrae, upon the first dorsal vertebra and upon the fourth and fifth lumbar vertebrae, the palpating hand becomes the nail hand. This change is made by substituting the pointer finger of the free hand for the pointer finger of the palpating hand when the correct surface on the vertebra to be adjusted is located.

It is essential in making the change from one pointer finger to another that not the slightest variation be permitted between the original surface palpated and that which is ultimately held by the pointer finger of the free hand. Even greater care should be exercised here than in the lower dorsal and upper lumbar regions because the adjuster is always standing on the side toward which the vertebra is subluxated

and he should be careful to see that the pisiform bone is placed on the side of the vertebra which is indicated by the laterality. Especially in the lower cervical and on the first dorsal vertebra, where the change is made, the neck slopes sharply away from the vertebrae and if he is not careful to see that the nail point is placed well on the side of the laterality, he will be apt to slip across when the adjusting move is delivered. In the regions where the nail point is changed, it is done because of the slope of the spine. In the case of the lower lumbar vertebrae, this slope is from the sacrum down to the middle lumbar region while in the case of the lower cervical and first dorsal vertebrae it is from the primary curve in the dorsal region up to the middle cervical region. If the adjuster did not change nail points he would find the arms and body in a very uncomfortable and awkward position.

Particularly in the lower cervical and on the first dorsal vertebrae the adjuster finds the tendency for the nail point to slip off from the spinous process of the vertebra being adjusted. This is for the reason that the neck slopes sharply away from the contact point and if the adjuster permits his nail hand to assume the proper arched position, he finds that there is no surface upon which to rest the tips of his fingers. This contact should be made by turning the fingers of the nail hand more nearly toward the superior, thus allowing the fingers to rest easily upon the occiput with the thumb extending upward in a direction just behind the pinna of the ear. Care however, should be taken to see that the elbow of the nail hand is held far removed from the adjuster's body because if this is not done, the wrist of the nail hand will be more or less relaxed and much of the force will be distributed to the fingers where they are in contact with the patient's body.

A common error here as in other regions of the dorsal and lumbar vertebrae is that due consideration is not given to the slope of the back at the contact point. For instance, if one has the seventh cervical vertebra that is subluxated to the superior, his leaning position should be such that his force

is being delivered from the point superior to the perpendicular drawn to the back at his point of contact. On the reverse, if we have a subluxation of the seventh cervical vertebra which shows inferiority we should lean in such a manner that the episternal notch is at a point below the perpendicular drawn to the back at the point of contact. This is not only true of the seventh cervical vertebra but it is also true of all those where the nail point is changed.

Another reason for the tendency of the adjuster to slip after his point of contact is made, is in the fact that the tension of the skin over the vertebra is made from the superior rather than the inferior. When this is done the skin is tending to pull the nail point somewhat toward the superior. Owing to the fact that the back is sloping toward the superior at the point of contact, this serves to increase the probability of the nail point slipping toward the superior.

Contact of nail point two in the cervical region. Much greater difficulty is experienced in the proper placing of nail point two in the cervical region than in the placing of nail point one in any part of the spine. This may be due to several causes and we will here point out some of the common errors which are made in this particular region.

In the first place it should be distinctly understood that nail point two is not found on the edge of the hand half way between the pisiform bone and the metacarpal-phalangeal joint. As a matter of fact it is found midway between the margin of the hand and the palmar surface, the contact being made through a heavy muscular tissue on the palmar surface of the metacarpal-phalangeal bone rather than behind it. In brief, the palmar surface of the hand should be raised from direct contact with the surface of the neck but should form an angle of not to exceed forty-five degrees with that surface. It might be stated here that this angle changes somewhat depending upon whether the subluxation being adjusted is a superior or inferior one or one merely showing laterality.

Beginners are very apt to fail to find the correct margin

of the vertebra to be adjusted. When the head is turned to the side of the adjusting bench, the axis is rotated nearly 90°. Being the most prominent cervical vertebra it is easily palpated and the adjuster, if looking for a contact upon the middle or lower cervical vertebrae, too often palpates straight down from the axis instead of on an angle corresponding to the line drawn between the spinous process of the axis and that of the seventh cervical vertebra. It is the failure of the adjuster to follow this diagonal line which leads so often to an improper contact being made. If the adjuster palpates straight down from the axis, he does not find the margin of the vertebra to be adjusted which he should place his contact upon. As a consequence instead of nail point two, coming in contact with the correct border of the vertebra it is more nearly nail point one. Because the neck slopes sharply downward and because it is more difficult to procure a proper anchorage with the fingers of the nail hand, the tendency is, in this event, to slip across the contact point of the vertebra when the adjustment is delivered.

It is also a common error to assume a position, with the small metacarpal bone, which is too nearly perpendicular to the surface of the upper adjusting bench. On the middle and lower cervical vertebrae, the metacarpal bone on the small finger side should be placed in such a manner that it is nearly horizontal to the surface of the bench. Naturally this angle varies in different parts of the cervical region, becoming more nearly to the perpendicular surface of the adjusting bench as the superior cervical vertebrae are adjusted.

A common error is also that of holding the nail hand too nearly erect with too great an angle between its palmar surface and the surface of the neck. It is found that when this is done, the forearm forms an obtuse angle with the dorsal surface of the hand when as a matter of fact this angle should be as great as possible and the wrist should thus be held in a rigid position so that there is no lost power by the dropping of the nail hand when the adjustment is delivered. Further-

more if the nail hand is held so that the contact is too near the margin of the hand, there is a tendency because of the lack of tension at the wrist, for the nail hand to alter its position by rolling one way or the other when the adjustment is delivered. This permits an actual loss of the contact point upon the vertebra and as a consequence, results in inaccuracy in the adjustment.

These errors can be largely overcome if the adjuster will give close attention to the several preceding paragraphs and see that his nail hand is properly placed. If he will now take care to see that the elbow of the nail hand is held far away from his body, he will find that this procedure produces a rigidity of the wrist which will not permit of the nail hand collapsing at the time of the adjustment and the consequent loss of force which is associated with this error.

Another valuable consideration is the technique of palpation just before the nail point is placed. If the adjuster will palpate from the axis downward to the vertebra in question, and will then pull the skin well across the margin of the vertebra, to be adjusted, he will carry with it the bulk of the trapezius muscle on that side of the neck. If he is careful now in holding this muscle to the side of the point of contact, he will find that the nail point may be placed more nearly in direct contact with the spinous process in question.

Under these conditions the nail point should be placed by first bringing the margin of the nail hand in contact with the neck immediately on the margin of the vertebra to be adjusted. With the pointer finger of the palpating hand still held in position he should now roll the nail hand in such a manner that the loose skin and muscle is pushed upward and laterally from under the point of contact. In doing this, he brings the palmar surface of the nail hand down until it rests upon the dorsal surface of the pointer finger. At the same time that the nail hand is rolled into this position it should be drawn somewhat laterally toward the side to which the patient's face is turned. In this way the loose mass of mus-

cular tissue and integument is more effectively held away from the point of contact and a better position is procured.

It may be that the adjuster who finds that he is slipping, when adjusting the cervical vertebrae, is not assuming the proper leaning position. He should ever bear in mind that the head of the patient has rotated 90° and that the cervical vertebrae have also rotated, although not to the same extent. The atlas has rotated more than any other vertebra, the axis next and third cervical vertebra next and so on until when the fifth cervical vertebra is reached we find the least degree of rotation of any of those vertebrae where nail point two is used. It should be remembered that posteriority indicates a direction to the posterior as compared with the position of the vertebra in question and not as compared with the general contour of the patient's body as he lies upon the adjusting table.

Contact upon the atlas. In adjusting the atlas the contact is found by a definite, specific system of measurement with the spinous process of the axis and the exposed transverse process of the atlas as a basis. The adjuster should not labor under the impression that he should feel the posterior ring of the atlas where his contact is procured. Rather, he should give his entire attention to the accuracy of his palpation upon the spinous process of the axis and the exposed transverse process of the atlas and be extremely careful in seeing that the measurements which he makes are accurate. In the majority of cases it is impossible to feel the posterior ring of the atlas under the contact point and it is this inability that is apt to lead the adjuster to the belief that he is not upon the proper contact point.

The same discussion which has been given out on the other cervical vertebrae is equally applicable to the atlas, and it would be well for the student who has difficulty in adjusting the atlas to read carefully the foregoing, pertaining to contact with nail point two upon the other cervical vertebrae.

The atlas, perhaps more than any other cervical vertebra

gives difficulty in assuming the correct contact and the correct leaning position. It is due to the incorrect leaning position that the greatest amount of trouble is experienced. Remembering that the atlas is rotated more than any other cervical vertebra, when the head is turned to the side upon the adjusting bench, the adjuster should give every consideration to posteriority when it is included in the symbols indicating the subluxation. He should lean in such a manner that his force is being delivered from the posterior and he should remember that posteriority as applied to the atlas is in a general way from the direction toward which the back of the patient's head is turned.

The metacarpal bone of the small finger in all positions of the atlas, except where posteriority is indicated, should be held in such a position that it is parallel to the surface of the adjusting bench. Where posteriority is indicated, it should be held in such a manner that its longitudinal axis forms an angle, if extended, of approximately 45° with the surface of the adjusting bench. Further, it should be carefully noted that the metacarpal bone of the small finger is extended straight across the spine. In other words, it should form an angle of 90° with the axis of the patient's body as he lies upon the table.

HOW TO DEVELOP MORE FORCE IN THE DELIVERY OF AN ADJUSTMENT.

Many adjusters find it difficult to deliver a sufficient amount of force to move the more difficult vertebrae. It will be found that there is a vast difference in patients and that while some possess vertebrae which are very easy to move, there are others whose vertebrae seem firmly anchored in the abnormal positions. This variation in patients is not governed by the size of the patient with any degree of constancy. Often it is found that a very small person will need a very hard adjustment while a larger muscular individual possesses vertebrae which move with much more ease and a far less amount of force is required. Probably the factor which has most to do

with the relative rigidity of the spine is the condition of the ligaments which bind the segments one with another. This may also be applicable to the muscles which have their attachment upon some part of the vertebra. If the ligaments connecting the vertebrae are more or less tense and if the muscles are more or less rigid, there is bound to be a more firm anchorage of the individual vertebra and greater difficulty will be experienced in its adjustment.

Thus far in the description of the adjusting move, we have concerned ourselves with the action of the arms and the downward thrust of the nail point which results from that action. A certain amount of force is derived from this sudden straightening of the arms and this force is dependent in part upon the strength of the muscles of the arms but more especially upon the speed with which the adjustment is delivered. However, there is another factor which must not be lost sight of and that is the weight of the adjuster's body and his ability to keep the shoulders down when the arms are suddenly straightened.

Particularly in the dorsal region where there is very little give or spring to the back, the arms cannot be straightened without the shoulders being somewhat raised. Mechanically, if the elbows are drawn together and the arms straightened, the distance between the shoulder joints and the nail point which is in contact with the spine is increased by several inches. If the spine of the patient does not go down these several inches, then the shoulders of the adjuster must go up. Naturally if the patient is a heavy man, the very weight of his body keeps the shoulders from being thrust upward when the adjustment is given and the greater part of his force is delivered to the spine of his patient. If however, the adjuster is a light person and if the arms are straightened with the same degree of rapidity and strength the body is not heavy enough to hold the shoulders down and much of the force is lost by the body of the adjuster being thrust upward when the adjustment is delivered. In order to overcome this dis-

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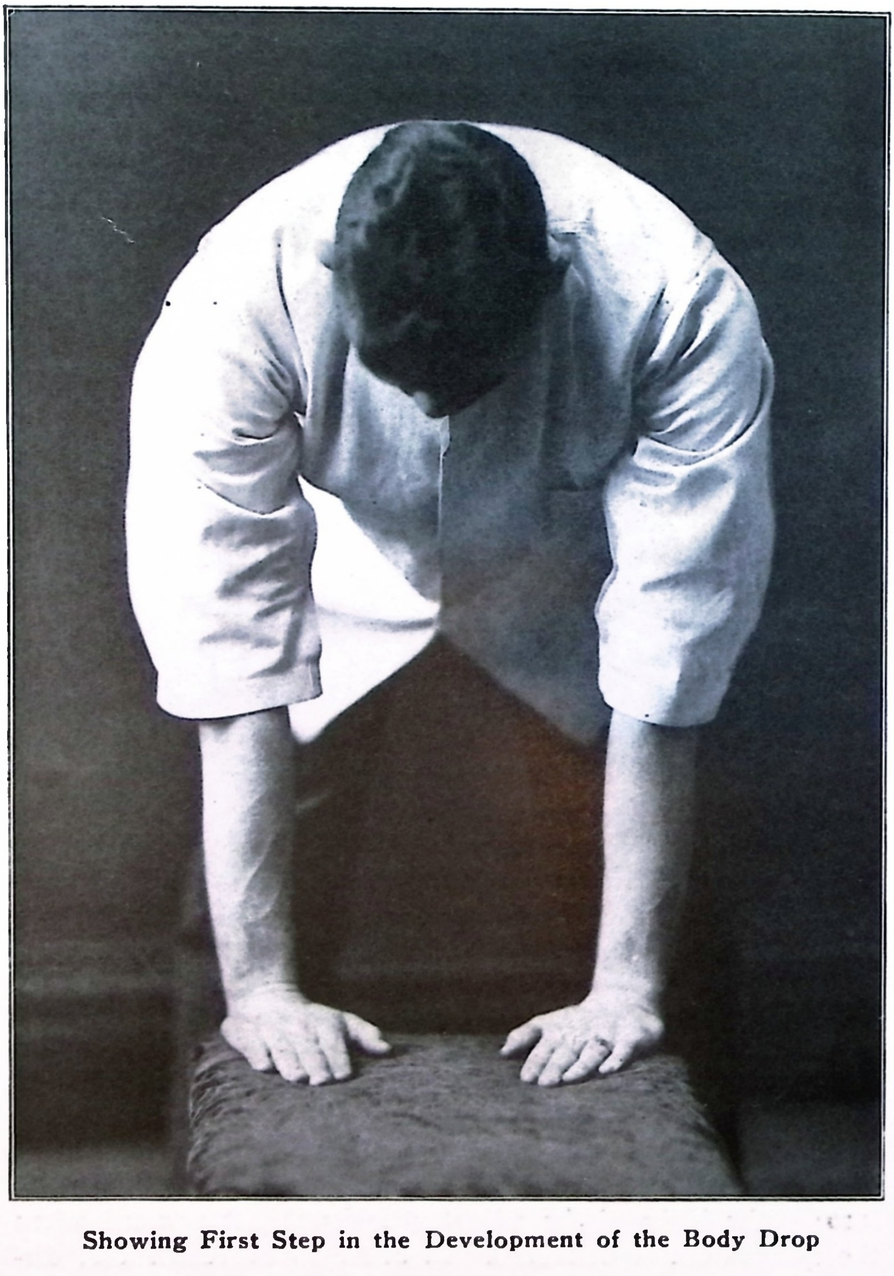

Showing First Step in the Development of the Body Drop

advantage of the small adjuster and in order to enable him to deliver the proper amount of force, in his adjusting move, a system has been devised whereby he can more readily and advantageously utilize the weight of his body and increase the force delivered in his adjustment.

If a person springs into the air he comes to the floor with a great deal of force because of the power of gravity pulling him downward. By the same token, if the adjuster can drop his body so that the weight lands upon his shoulders at the time the adjustment is given, he can produce more force than he could otherwise obtain. In other words, though the shoulder joints must be thrust upward at the time the adjustment is delivered, this does not mean that the entire body must be thrust upward at this time.

On the reverse if the patient drops his trunk between the shoulder joints at the time the adjustment is delivered, he will have added materially to the weight available in giving the adjustment.

All of this sounds very simple yet one would be surprised at the difficulty in co-ordinating the action of the arms and that of the body in utilizing this method. In order to best obtain the desired results it is well for the adjuster not to try to use the arm action and the body action together until he shall have mastered each separately. We will here give a series of exercises which through experience have been found to be the most practical in developing the proper action of the body to gain greater force.

Method. Place both hands upon a flat solid surface about twenty inches from the floor with the palms down. In this exercise the arms should be held perfectly rigid and whatever movement takes place should be of the body between the shoulders with more or less flexion at the waist.

One. Stretch the body upward as far as possible, straightening up to the greatest possible degree without taking the hands off from the surface with which they are in contact.

Two. Permit the body to relax suddenly and fall between

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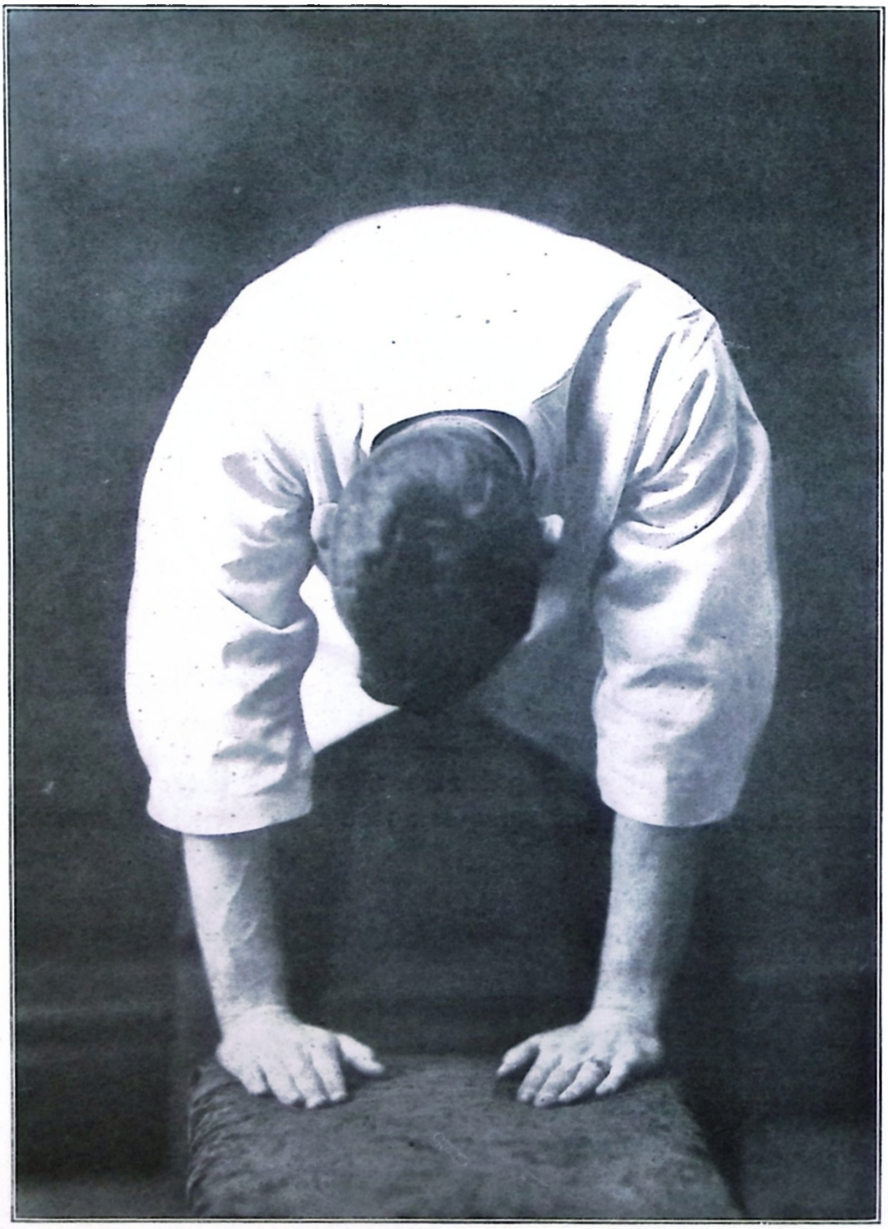

Position After Body Has Dropped Between the Shoulders

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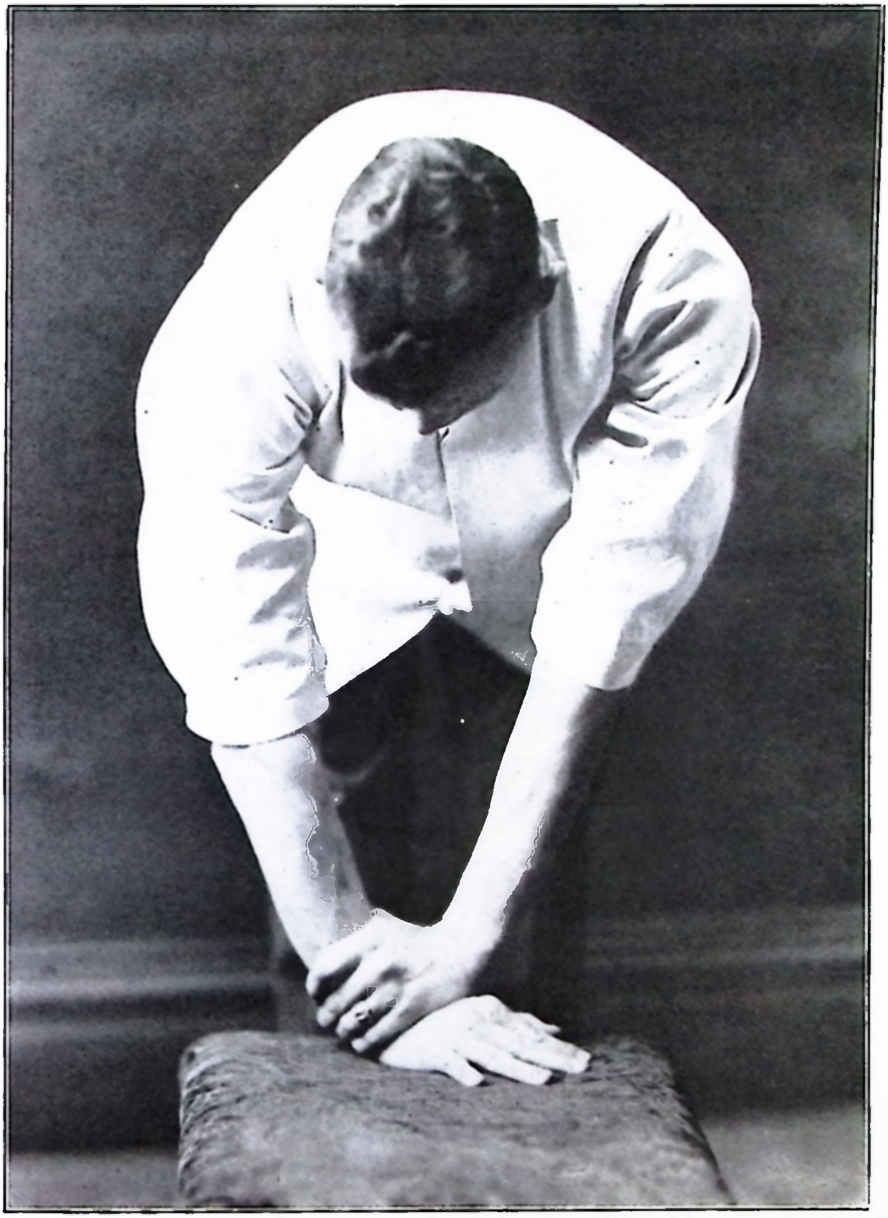

Showing the Second Stage in the Development of the Body Drop

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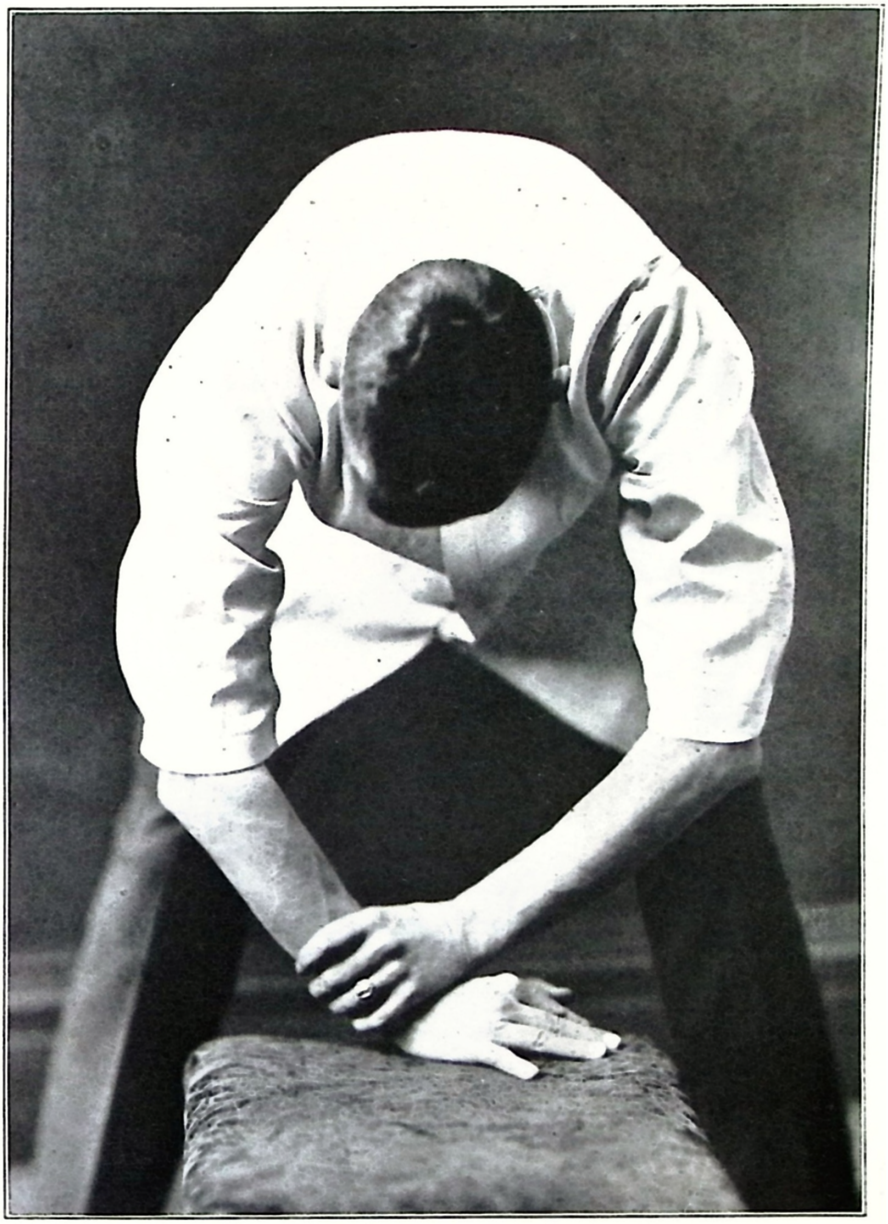
Showing Position After Body Has Dropped Between the Shoulders

Cut 44



Showing Third Stage in the Development of the Body Drop

the two shoulders. It will be found that in this manner a certain amount of force is delivered to the hands. In the actual delivery of an adjustment the force delivered on each of the two hands is just double because one of the hands becomes the hammer hand and its force is delivered to the nail hand which has its nail point in contact with the vertebra to be adjusted. Thus all the force which is so gained by dropping the body, in the actual delivery of an adjustment, is concentrated to one small area namely the nail point which is in contact with the vertebra.

Beginners are very apt to find it difficult to perform this exercise and allow the body to fall between the shoulders and at the same time hold the arms rigid. The tendency will be to permit the arms to bend when the body drops but this must be overcome before the student can utilize this method to the fullest advantage.

After this exercise has been thoroughly mastered, the student should alternate so that the hands, instead of being placed on a flat surface palms down, are placed in the proper position for giving the adjusting move. Namely, one hand becomes the nail hand while the other becomes the hammer hand and each should be held in the proper position. At this time however, the arms should be held rigid as in the foregoing exercise.

One. The body should be straightened as far as possible without raising the nail hand and hammer hand from their correct positions. And it should be especially noted that the elbows are held straight so that the arms are rigid.

Two. Relax the body completely as in the foregoing exercise permitting it to fall heavily between the shoulders. It will be noted in this exercise that apparently a great deal more force is gained by the dropping of the body that in the foregoing exercise. This however, is for the reason that the force was all concentrated on one point, namely the nail point while in the exercise given before it was spread out over the palms of both hands.

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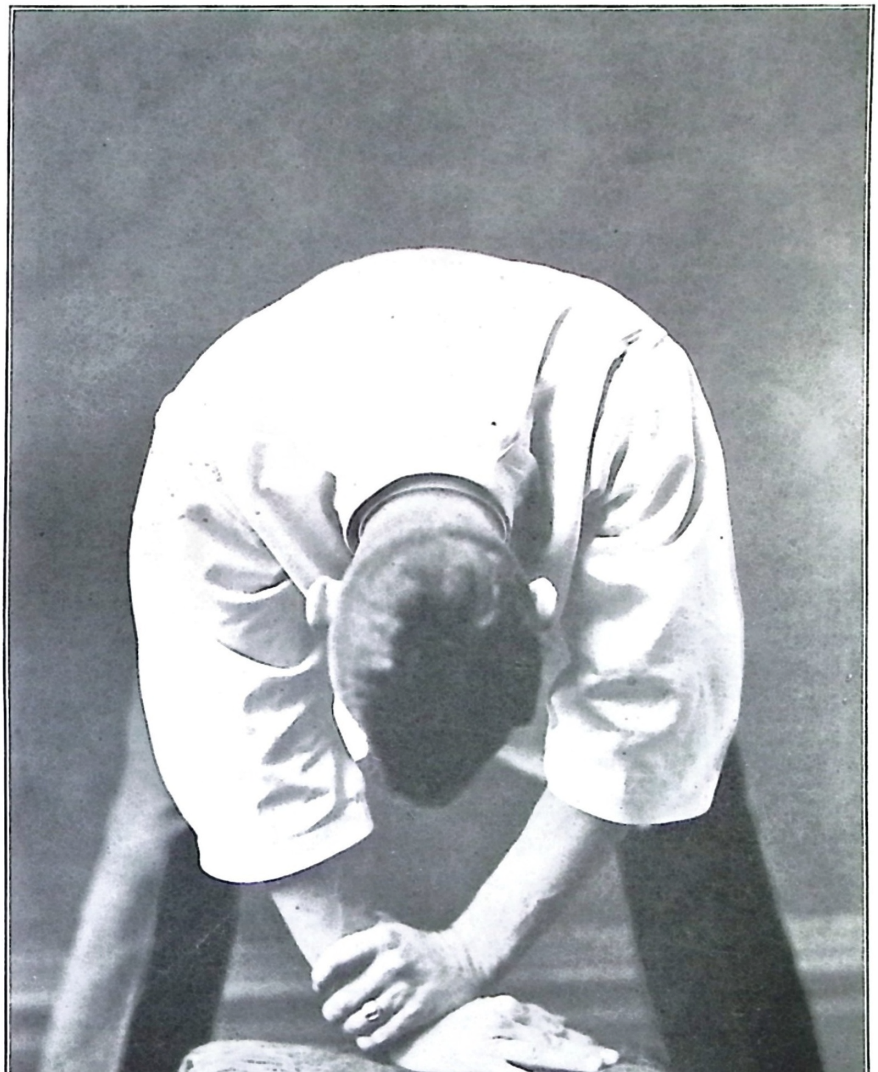

Position After the Body Has Dropped Between the Shoulders

The next stage in the development of this method is that of combining the body drop with the arm action. In other words, instead of beginning as in the two previous exercises, the elbows should be bent at an angle of approximately 140° each and when the body drops the arms should be straightened by bringing the elbows together.

One. Assume the position as in the foregoing exercises except that instead of holding the arms rigid they should be held so that they are bent at the elbows at the proper angle.

Two. Permit the body to descend slowly between the shoulders and at the same time straighten the arms. The maximum descent of the body should in this exercise occur at exactly the same instant that the arms become entirely straight.

We have advised that this action be consummated slowly but this applies only to the period when we are beginning to combine both the arm action and the body drop. Each day the adjuster should increase the speed of the body drop and the straightening of the arms but the most careful attention must be given to see that the weight of the body lands upon the shoulders at the same instant that the arms become straight. In other words we are utilizing two methods of obtaining force and we are combining them. In order to be effective both of these forces must be delivered at exactly the same instant because if they are spread out over a great length of time they act as two distinct forces neither one of which alone, may be able to move the vertebra. Too much emphasis cannot be laid upon the necessity of so coördinating these two actions that they are delivered at exactly the same instant. This is absolutely an essential and must be watched very closely in order that the best results be obtained.

This leads us directly to the consideration of speed as an essential factor in delivering the greatest possible amount of force. If for instance we are capable of delivering two hundred pounds of force in one second of time, then only one hundred pounds is delivered in half a second of time. Only

fifty pounds is delivered in one fourth of a second of time and only twenty pounds is delivered in one tenth of a second of time. If now, instead of spreading our two hundred pounds out over an entire second of time and thus actually delivering only twenty pounds in one tenth of a second, we are able to concentrate all of our force in one tenth of a second, then the actual effective driving power is made just ten times as great.

POSITION OF THE SHOULDERS.

In the assuming of the proper position for adjusting any subluxation in the spine, the position of the shoulders plays an important part. Particularly is this true in the cervical region although incorrect postures are assumed in the dorsal and lumbar regions which are directly due to an uncomfortable and incorrect position of the shoulders.

It may be stated in a general way that the shoulders are at all times held in the most comfortable position. In the dorsal and lumbar regions and on the sixth and seventh cervical vertebrae, a line drawn between the two shoulder joints and extended, should be parallel to the patient's spine, for a PR or a PL subluxation. For a PS or a PI subluxation, this line should be at right angles to the line of the spine and for any three lettered subluxation it is neither parallel nor at right angles but is oblique as compared to the alignment of the spine. In the cervical region the shoulders should be allowed to assume a normal easy position without undue attention being paid to their alignment. In some positions, it is easier to hold the shoulders at right angles to the spine of the patient, while in others it is easier to permit them to assume an oblique position. It is not of particular importance as to the alignment of the shoulders providing they are not so placed as to hinder the proper delivery of the adjustment.

Much of the confusion in the cervical region arises from the fact that when it becomes necessary for the adjuster to lean across the patient, he is apt to bend one arm more than the other and thus tilt the shoulders in such a way that an

equal amount of force will not be delivered from each. If the nail hand and the hammer hand are properly placed and if the elbows are bent equally, both shoulders are an equal distance from the nail point and when the arms are straightened, no more force is delivered from one than from the other. When the adjuster is careful to see that an equal amount of force is delivered from each arm he can rest assured that his episternal notch indicates the actual direction from which the combined force is being delivered. It is only in this way that he can be positive of the correct direction of drive. If, for instance, the left arm is bent more than the right and if both arms are straightened at the same instant, then the greater force is delivered from the left arm. If this is true, the direction from which the combined forces are delivered is nearer to the left shoulder than it is to the right and this may often lead to an improper direction being applied to the vertebra under adjustment.

PALPATING WHILE PATIENT IS ON THE ADJUSTING TABLE.

Adjusters without the proper experience are very apt to palpate each vertebra while the patient is lying on the table, for the purpose of discovering abnormal positions if such exist. Even though they may have the analysis of the patient lying before them they palpate the vertebra indicated in that analysis to make sure that they are subluxated as listed. This is an improper procedure for the reason that in many cases the spine assumes an entirely different aspect when the patient is in the prone position on the table than when he is sitting in the proper position for palpation. Many cases have come to our attention wherein a certain dorsal or lumbar vertebra palpates PR or PL when the patient is in the proper position for palpation but when they assume the prone position on the adjusting table the vertebra may palpate in exactly the opposite direction.

Because of the foregoing it should be impressed upon the

adjuster that he should not assume that the apparent subluxations which he finds while the patient is on the adjusting table are true subluxations.

PLACING OF THE PATIENT UPON THE ADJUSTING TABLE.

The adjuster should always exercise extreme care in placing his patient upon the adjusting table. An adjusting table is used with or without the abdominal support; the patient's thighs resting upon the back section with the upper part of the chest and also the head upon the front section. He should be placed in such a manner that the pubic bones just clear the back section and the weight of the body rests upon the thighs. He should be placed upon the front table so that only the upper third of the sternum rests upon this section. This is especially important in women to avoid resting the weight of the body upon the breasts. The patient's arms should be folded or allowed to rest easily beneath the front section.

Some little experience may be required in order to properly gauge the distance which the adjusting benches must be separated. When this is accomplished the adjuster should have the patient kneel on the rear adjusting bench facing the front bench and the knee placed as far away from the front edge of the rear bench as the distance between his knees and the public bones. This also may be difficult to gauge properly until proper experience has been acquired.

Several methods may be used from here on but we suggest the following. If standing on the right side of the patient, grasp his right arm with your left hand near the axila and with your right hand grasp his right hand. Now tell the patient to support himself with the left hand placed upon the rear end of the front adjusting bench. In this way lower the patient to the proper position as heretofore described.

Where the Hy-Lo table is used the proper adjusting of

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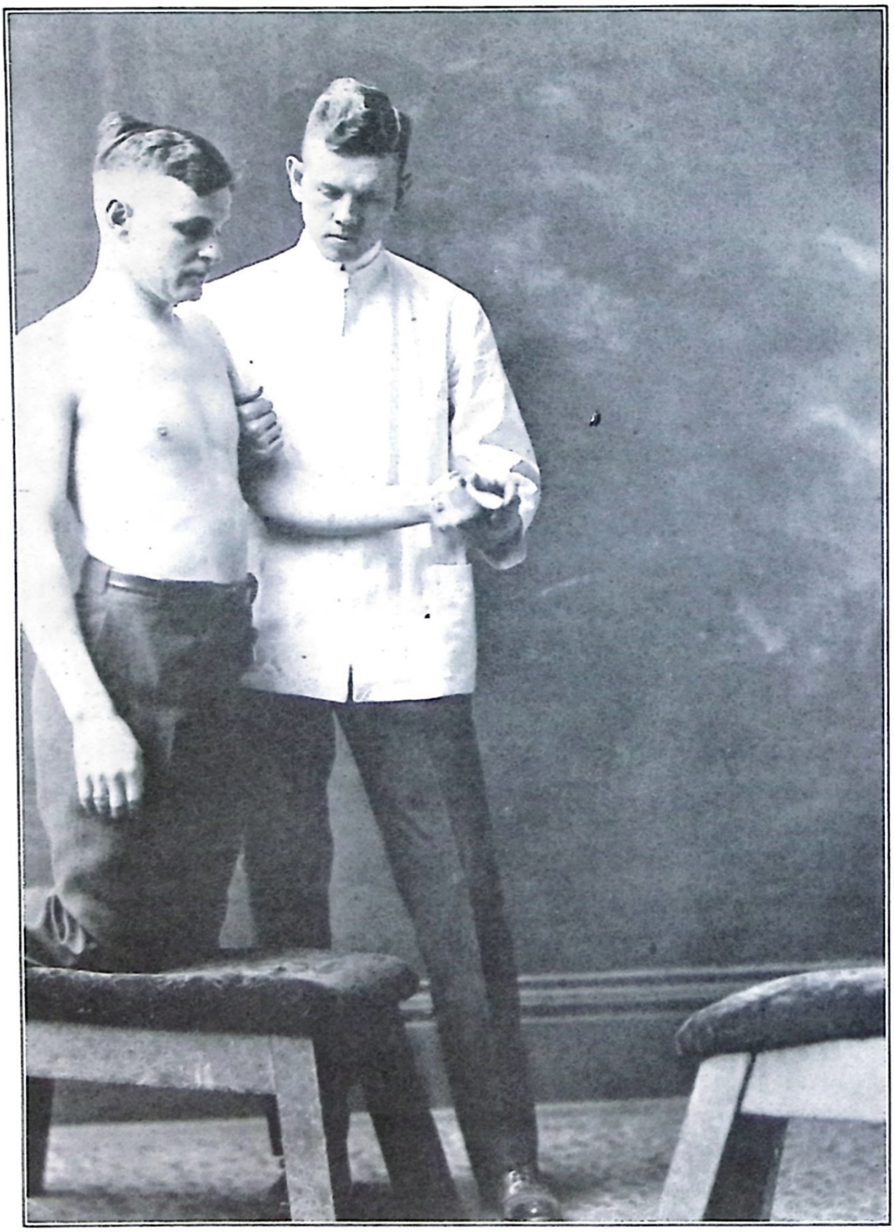

Showing Patient Ready to Be Lowered to the Adjusting Tables

Cut 47

Patient Being Lowered to Adjusting Tables

Cut 48

Patient in Proper Position on Tables

the two sections may be made before the patient is lowered for adjustment.

There are deformities or peculiarities in some patients which make it necessary to use a different method than the foregoing in placing them upon the adjusting table. Here alterations must be made which naturally vary according to the circumstances.

RECOIL ADJUSTMENT FROM SECOND DORSAL TO THIRD LUMBAR VERTEBRA INCLUSIVE.

The adjuster has already learned that the moveable vertebrae of the spine, excepting the atlas, may be subluxated in nine different directions and the force which is applied in the correction of these subluxations must be delivered from the direction which is indicated by the recorded listing. However, due cognizance must be made of the fact that there are many general irregularities of the spine such as curves and curvatures, and allowance must be made for them in giving the adjustment so that the direction of the force may be varied to accommodate these irregularities. When the adjuster is standing on the left side of the patient, the right hand becomes the palpating hand, the left hand the nail hand and the right hand the hammer hand. He should stand in the imaginary line drawn between the actual subluxated position of the vertebra and its true normal position.

Anyone of the nine subluxations possible in this group may be adjusted with the adjuster standing on either side of the patient, but for the sake of convenience, it is assumed that the adjuster is standing on the right side of the patient in the following explanation.

Posterior Subluxation. Palpation is made with the left hand and the spinous process of the subluxated vertebra is located with the tip of the second finger. The first and third fingers are then withdrawn, the palpation hand lowered, palm down, to the back of the patient, and the nail hand placed with the adjusting surface of the pisiform bone upon the

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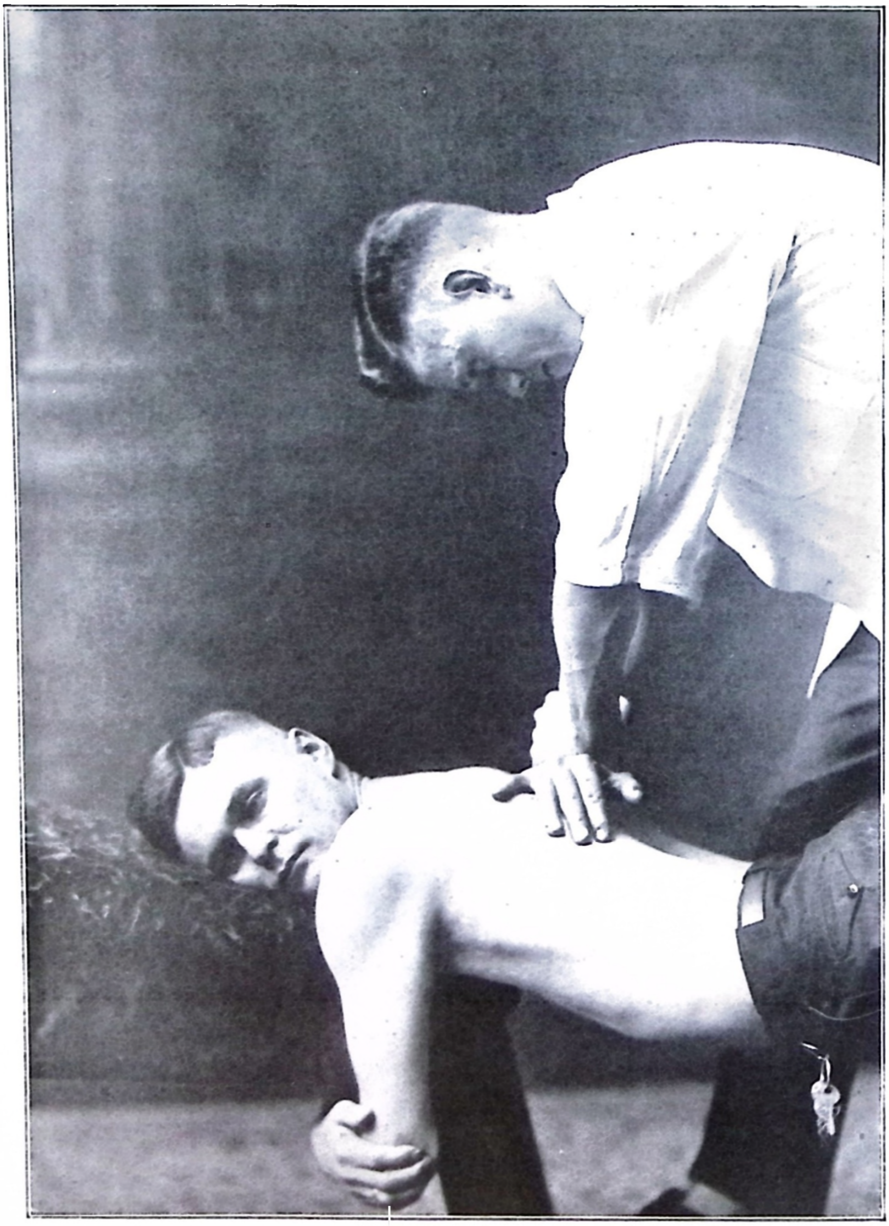

Correct Position for Posterior Subluxation with Adjuster Standing on the Right Side

posterior surface of the spinous process. The pointer finger is then removed and the left hand becomes the hammer hand with the pisiform bone placed in the groove formed by the arching of the nail hand and with the fingers and thumb firmly grasping the wrist of the right hand. The adjuster should at this time, be standing inferior to the vertebra to be adjusted, his elbows pointing across the spine, his episternal notch directly posterior to the point of contact and with the little finger forming a right angle with the spine. After assuming this position the arms and shoulders are thoroughly relaxed and the adjustment delivered.

When the adjuster is standing on the left side of the patient, the right hand becomes the palpating hand, the left hand nail hand and the right hand hammer hand. Here, as on the right side, he stands inferior to the subluxation with the shoulders extending across the spine. He also leans in such a way that the episternal notch shall be directly posterior to his point of contact. When the adjuster is standing on the left side of the patient the apex of the pisiform bone projects toward the left side of the spinous process. It is only the actual contact surface of the pisiform bone which comes in direct contact with the posterior surface of the spinous process.

Posterior Right Subluxation. With the adjuster standing on the right side of the patient, palpation is made with the left hand and the spinous process of the subluxated vertebra located as before. Slight variation is made however, in that the posterior right border of the spinous process is indicated by the pointer finger and the nail point is brought in contact with this surface. The standing position is directly opposite the subluxation but the episternal notch is posterior and to the right of the point of contact. This position is acquired by leaning slightly backward. The adjustment is then given by directing the force downward and to the left.

When the adjuster is standing upon the left side of the patient the right hand becomes palpating hand, the left hand nail hand and the right hand hammer hand. He should in

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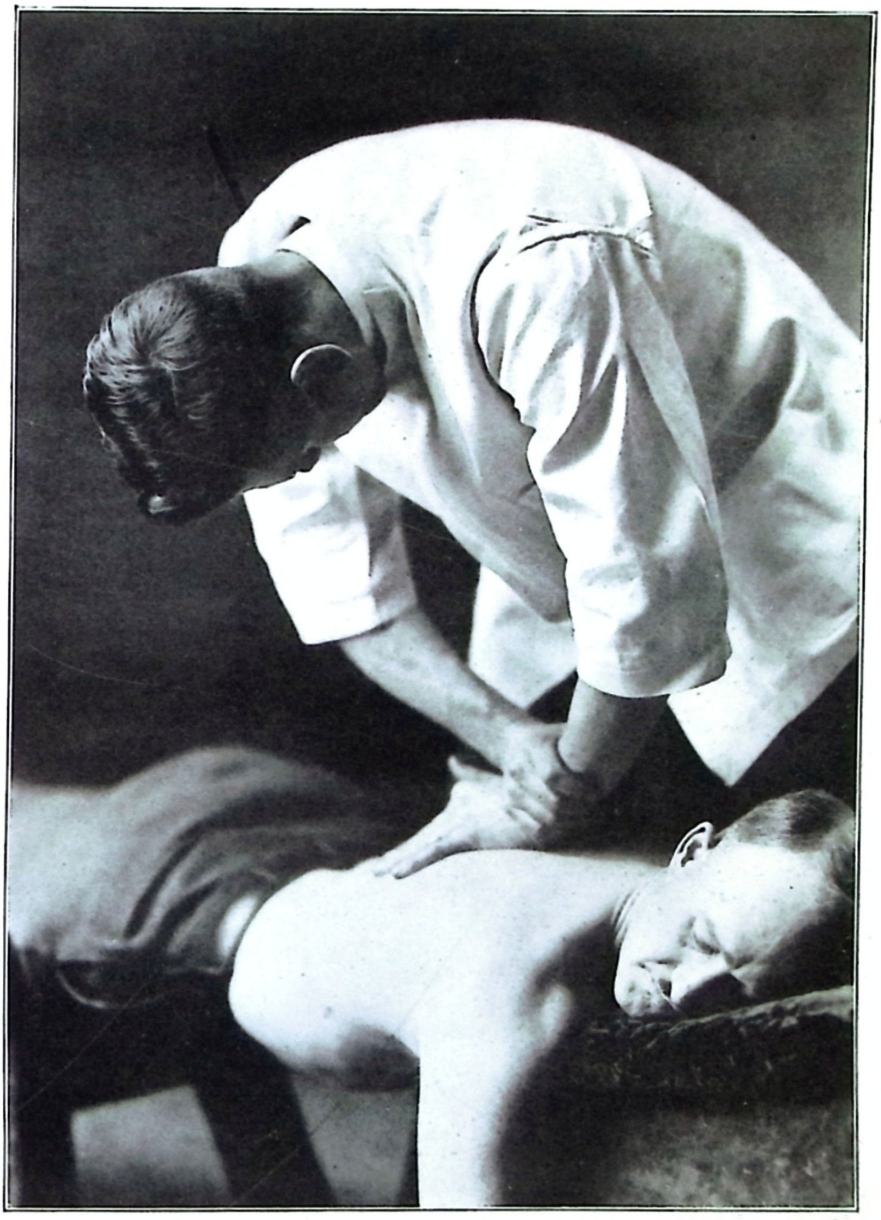
Correct Position for Posterior Right Subluxation with Adjuster Standing on the Right Side

Cut 51

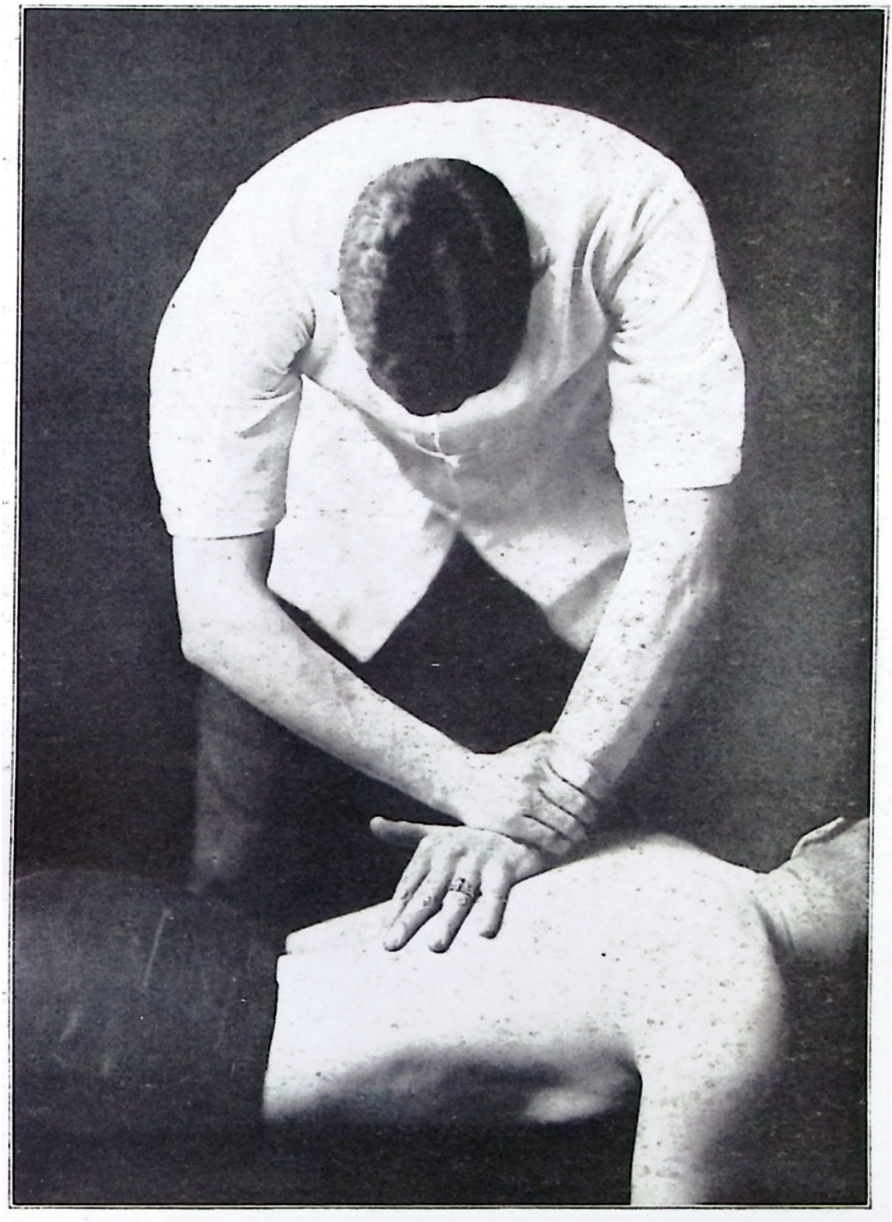


Correct Position for Posterior Right Subluxation with Adjuster Standing on the Left Side

Cut 52

Correct Position for Posterior Left Subluxation with Adjuster Standing on the Right Side

Cut 53



Correct Position for Posterior Left Subluxation with Adjuster Standing on the Left Side

Cut 54

Correct Position for Posterior Superior Subluxation with Adjuster Standing on the Right Side

Cut 55

Correct Position Posterior Inferior Subluxation with the Adjuster Standing on the Right Side

this event, stand directly opposite the subluxation but he should lean in such a way that his episternal notch is posterior and superior to the point of contact. This is accomplished by standing close to the patient and leaning across. The adjuster should however, bear in mind that his weight should be entirely supported on his feet in order that undue pressure may not be placed upon the spine of the patient.

Posterior Left Subluxation. Palpation is made with the left hand and the posterior left surface of the spinous process of the subluxated vertebra indicated with the pointer finger. The nail hand is placed with the nail point upon this surface, the pointer finger removed and the left hand placed as hammer hand. The adjuster should now lean slightly across the patient bringing the episternal notch to a point posterior and left of the contact and with the elbows parallel to the line of the spine. Standing directly opposite the subluxation, the force is applied downward and to the right in a line from the episternal notch.

When the adjuster is standing on the left side of the patient the right hand is used as the palpating hand, the left hand as nail hand and the right hand as hammer hand. The adjuster here should stand directly opposite the subluxation and lean slightly backward in order that his adjustment may be delivered from the posterior and left.

Posterior Superior Subluxation. In the dorsal region the face of the patient should be turned away from the adjuster but in the lumbar region it may be turned either way. Palpation is made with the left hand when the adjuster is standing on the right side of the patient and the posterior superior surface of the spinous process is located by the tip of the pointer finger. The adjuster should now step to the inferior with his right foot forward and with both legs resting against the body of the patient. The nail point should be placed upon the surface indicated by the pointer finger with the little finger of the nail hand at right angles to the spine. In this position the apex of the nail point should extend toward the right side of

Cut 56

Correct Position for Posterior Right Superior Subluxation with Adjuster Standing on the Right Side

the spinous process and the shoulders of the adjuster should be held as nearly as possible at right angles to the spine of the patient with the arms equally bent. This is one of the positions in the dorsal and lumbar regions where there is a tendency to bend one arm more than the other and thus to deliver a greater force from one side than from the other. The adjuster should lean so that the episternal notch is posterior and superior to the point of contact. After noting the relaxation of the arms and shoulders, the adjustment is delivered.

When the adjuster is standing on the left side of the patient, the right hand becomes the palpating hand, the left hand the nail hand and the right hand the hammer hand. The adjuster should stand to the inferior and the patient's face should be turned from him in the dorsal region. The line of the shoulders should be at right angles to the spine of the patient, the small finger of the nail hand should be at right angles to the spine of the patient and the adjuster should lean so that the episternal notch is posterior and superior to the point of contact. Care should be taken here also to see that the arms are equally bent that no more force will be applied from one side than from the other.

Posterior Inferior Subluxation. The face of the patient should be turned away from the adjuster in this subluxation in order that the spinous processes may be rotated somewhat toward the side on which the adjuster is standing and thus make his standing position easier to assume. When the adjuster is standing on the right side of the patient, the palpation is made with the left hand and the posterior inferior border of the spinous process of the subluxated vertebra is indicated by the pointer finger. The adjuster should now step to the inferior with his right foot forward and with both legs resting against the body of the patient. The nail point should be placed on the posterior inferior border of the spinous process tip with the little finger forming a right angle with the line of the spine. The pointer finger should now be removed and the left hand placed as the hammer hand. The arms should be

held in such a way that the shoulders form a right angle with the spine. The adjuster should lean so that the episternal notch is posterior and inferior to the nail point and in this particular subluxation, extreme care must be exercised to see that this inferior direction is inferior to a perpendicular dropped to the surface of the back at the point of contact. After noting the relaxation of the arms and shoulders the adjustment is delivered, directing the force downward and toward the superior.

When the adjuster is standing on the left side of the patient, the right hand becomes the palpating hand, the left hand the nail hand and the right hand the hammer hand. In this position also the adjuster should stand at the inferior and should be careful that his episternal notch is inferior to a perpendicular line drawn to the surface of the back at the point of contact. Care should also be exercised to see that the arms are equally bent and that the small finger of the nail hand is at right angles to the line of the spine.

Posterior Right Superior Subluxation. In this subluxation the face of the patient is turned toward the right. Palpation is made if the adjuster is standing on the right side, with the left hand and the posterior right superior surface of the spinous process of the subluxated vertebra is indicated by the pointer finger. The adjuster should now step to the superior so that he is standing in the line drawn between the abnormal position of the spinous process and its normal position. Facing his patient, the nail point is placed upon the surface indicated by the pointer finger with the small finger of the nail hand pointing to the left and inferior at an angle of about 45° with the spine. The pointer finger is then removed and the left hand is placed as the hammer hand. The arms and shoulders should be held so that they cross the spine obliquely at an angle of approximately 45° and the adjuster should lean so that the episternal notch is posterior right and superior to the point of contact. The surface of the back, where the contact is made, should be carefully noted and the adjuster should be

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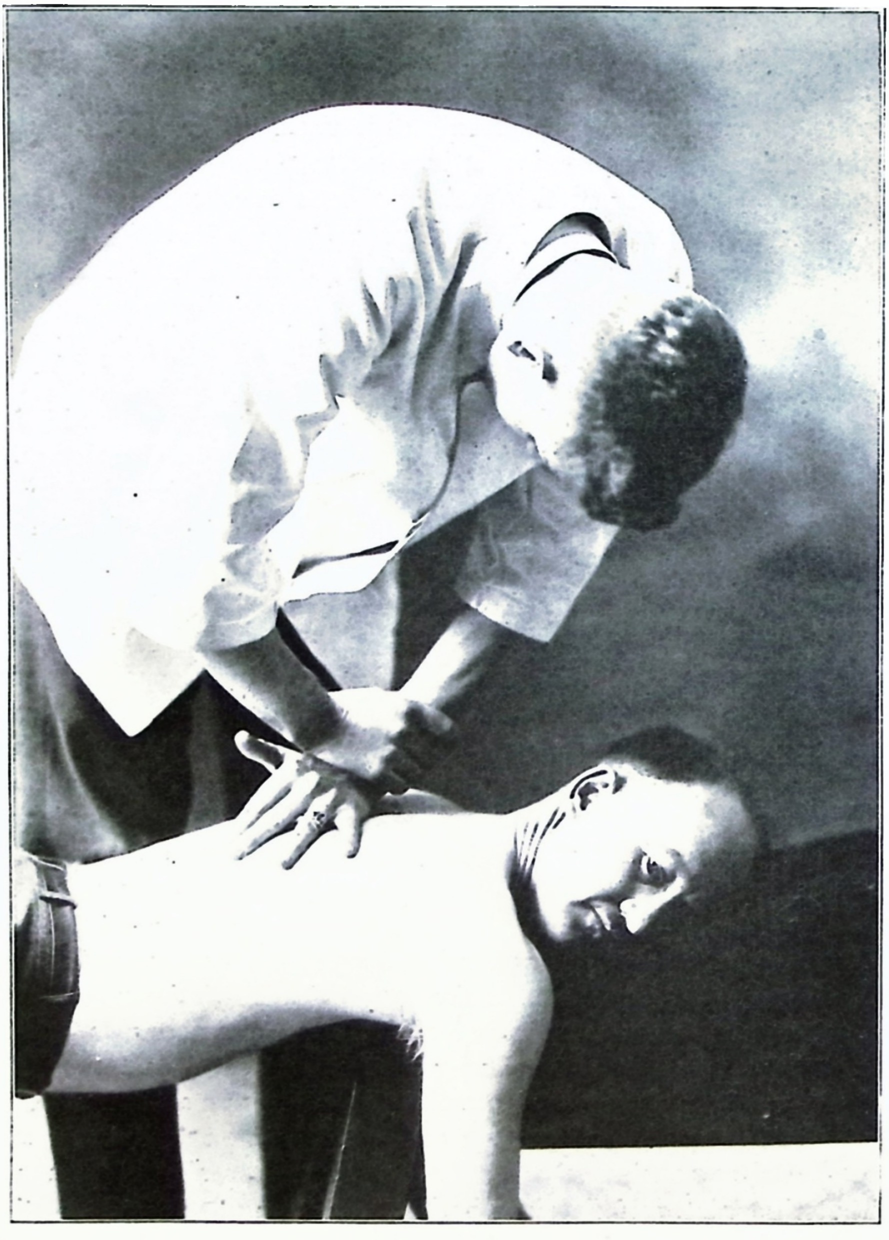

Correct Position for Posterior Right Superior Subluxation with Adjuster Standing on the Left Side

Cut 58

Correct Position for Posterior Right Inferior Subluxation with Adjuster Standing on the Right Side

careful to see that the line of his drive is posterior right and superior to a perpendicular line dropped to the surface of the back at the point of contact. After noting the relaxation of the arms and shoulders the adjustment is delivered, directing the force downward, toward the left and inferior.

When the adjuster is standing on the left side of the patient, the right hand becomes the palpating hand, the left hand the nail hand and the right hand the hammer hand. He should stand facing the patient, but in this event he should stand to the inferior of the point of contact and very close to the body of the patient. Extreme care should be taken to see that the surface of the back is considered when the leaning direction is assumed. The arms, in this position, should be held so that they cross the spine obliquely at an angle of approximately 45°. The small finger of the nail hand should be pointed as nearly straight away from the adjuster as is possible. Thus the small finger would point to the right and superior at an angle of approximately 45°. Care should be taken also to see that the weight of the body is placed firmly upon the feet of the adjuster so that no undue pressure is placed upon the back of the patient.

Posterior Right Inferior Subluxation. The face of the patient is turned, in this case, toward the right. When the adjuster is standing on the right side, the palpation is made with the left hand and the posterior right inferior surface of the spinous process of the subluxated vertebra is indicated by the tip of the pointer finger. The nail hand should be placed in such a way that the small finger points toward the left and superior, directly away from the adjuster. The pointer finger should be removed and the left hand placed as the hammer hand. The arms and shoulders should be held so that they cross the spine obliquely at an angle of approximately 45° and the adjuster should lean so that the episternal notch is posterior, right and inferior to the point of contact. After noting the relaxation of the arms and shoulders, the adjustment is

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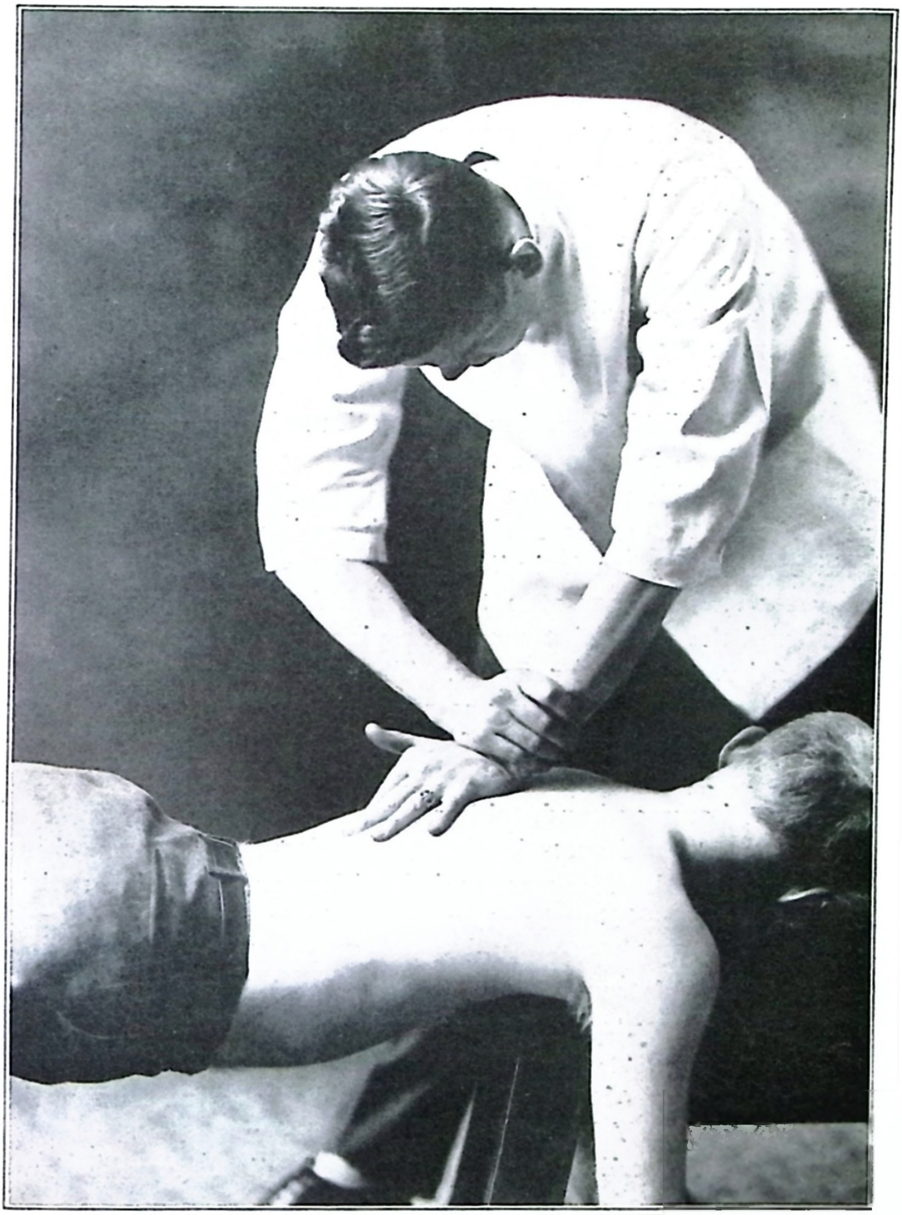
Correct Position for Posterior Right Inferior Subluxation with Adjuster Standing on the Left Side

Cut 60

Correct Position for Posterior Left Superior Subluxation with Adjuster Standing on the Right Side

Cut 61



Correct Position for Posterior Left Superior Subluxation with Adjuster Standing on the Left Side

delivered, directing the force downward and toward the left and superior.

When the adjuster is standing on the left side of the patient, the right hand becomes palpating hand, the left hand the nail hand and the right hand the hammer hand. In this position the adjuster should stand at the superior of the subluxation facing his patient, standing close to the body of the patient and leaning across and to the inferior. This position brings the episternal notch to a point posterior, right and inferior to the perpendicular dropped to the surface of the back at the point of contact.

Posterior Left Superior Subluxation. The face of the patient is turned toward the left and if the palpater is standing on the right side palpation is made with the left hand and the posterior left superior surface of the spinous process of the subluxated vertebra is indicated by the pointer finger. The adjuster should now step to the inferior, dropping the nail hand and the nail point should be placed upon the surface indicated by the pointer finger. The small finger of the nail hand should point as nearly as possible directly away from the adjuster making an angle of about 45° with the line of the spine. The pointer finger is then removed and the left hand placed as hammer hand, taking care that the pisiform bone of the hammer hand rests in the groove formed by the arching of the nail hand. The arms and shoulders are so held that they cross the spine obliquely at an angle of approximately 45° and the arms should be equally bent. The adjuster should lean so that the episternal notch is posterior left and superior to the point of contact. In order to assume this position, he must step close to the patient and lean across but he should not permit any of the weight of his body to rest upon the patient's spine. After noting the relaxation of the arms and shoulders, the adjustment is delivered, directing the force downward toward the right and inferior.

When the adjuster is standing on the left side of the patient, the right hand becomes palpating hand, the left hand

Cut 62

Correct Position for Posterior Left Inferior Subluxation With Adjuster Standing on the Right Side

nail hand and the right hand hammer hand. In this event the adjuster should stand superior to the point of contact facing his patient and with the small finger of the nail hand forming an angle of approximately 45° with the line of the spine. Care should also be taken to see that the shoulders and arms lie obliquely across the spine, also forming an angle of approximately 45°. The adjuster should lean in such a manner that the episternal notch is posterior left and superior to the perpendicular dropped to the surface of the back at the point of contact.

Posterior Left Inferior Subluxation. The face of the patient is turned toward the left and if the adjuster is standing on the right side of the patient, the palpation is made with the left hand. The posterior left and inferior surface of the spinous process of the subluxated vertebra is thus located and is indicated by the pointer finger. The adjuster should now step to the superior, still facing the patient. The nail hand should be placed with the point of contact upon the surface indicated by the pointer finger. The pointer finger should be removed and the left hand placed as hammer hand. The nail hand should now show the small finger pointing as nearly as possible directly away from the adjuster and forming an angle of approximately 45° with the line of the spine. The arms and shoulders should be held so that they cross the spine obliquely and the adjuster should lean so that the episternal notch is posterior, left and inferior to the point of contact. After noting the relaxation of the arms and shoulders, the adjustment is given, directing the force downward toward the right and superior.

When the adjuster is standing on the left side of the patient, the right hand becomes palpating hand, the left hand the nail hand and the right hand hammer hand. He should stand to the inferior of the subluxation facing his patient and far enough away that he may lean backward to bring his episternal notch posterior left and inferior to the perpendicular drawn to the surface of the back at the point of contact. He

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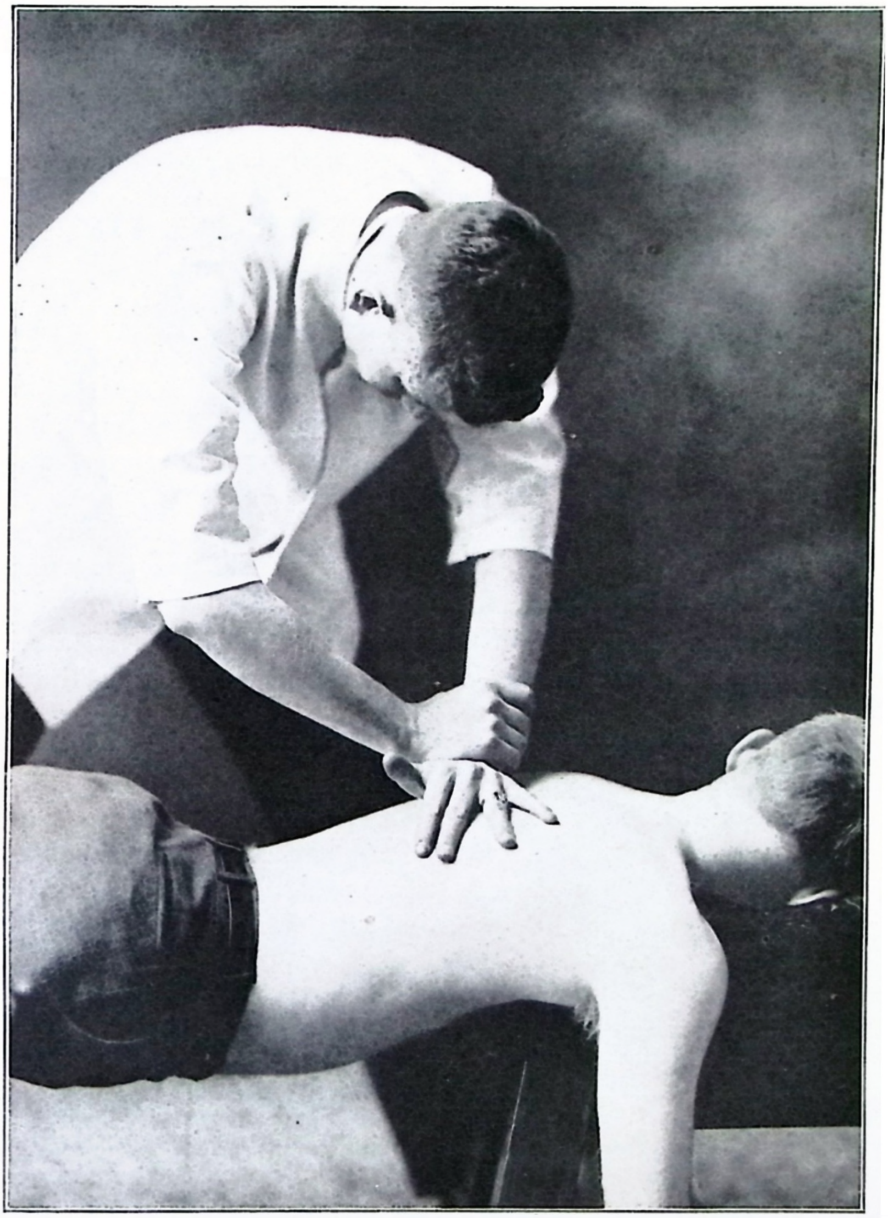

Correct Position for Posterior Left Inferior Subluxation with Adjuster Standing on the Left Side

should also take care to see that the small finger of the nail hand is pointing away from him, forming an angle of approximately 45° with the line of the spine. He should also see that the arms and shoulders are held obliquely across the spine, forming also an angle of approximately 45°.

RECOIL ADJUSTMENT OF FOURTH AND FIFTH LUMBAR VERTEBRAE.

From careful clinical observation it has been found that the fourth and fifth lumbar vertebrae are placed in such an angle that when the patient is lying on the adjusting table it is advantageous to use the palpating hand as nail hand in giving an adjustment. This is done by exchanging the pointer finger on the palpating hand for the pointer finger of the opposite hand after the surface where the contact is to be placed, has been found. The palpating hand is then placed as nail hand and the other as hammer hand.

Posterior Subluxation. In this subluxation the adjuster may stand on either side of the patient. Assuming that he is standing on the right side, the left hand is used as the palpating hand and the very posterior tip of the spinous process is located with that hand. The pointer finger of the palpating hand is now exchanged for the pointer finger of the opposite hand and the adjuster assumes the standing position well to the superior with both legs resting against the patient's body. The contact point of the pisiform bone is now placed on the surface being held, with the little finger of the nail hand pointing at right angles to the line of the spine. The pointer finger of the right hand is removed and this hand is then placed as the hammer hand, care being taken to see that the pisiform bone of the right hand rests firmly in the groove formed by the arching of the nail hand. The adjuster should lean in such a way that a line drawn from the episternal notch to the contact point will be perpendicular to the surface of the back at the point of contact. The shoulders and arms of the adjuster should cross the spine of the patient at right angles and the

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Correct Position for Posterior Subluxation of Fifth Lumbar Vertebra with Adjuster Standing on the Right Side

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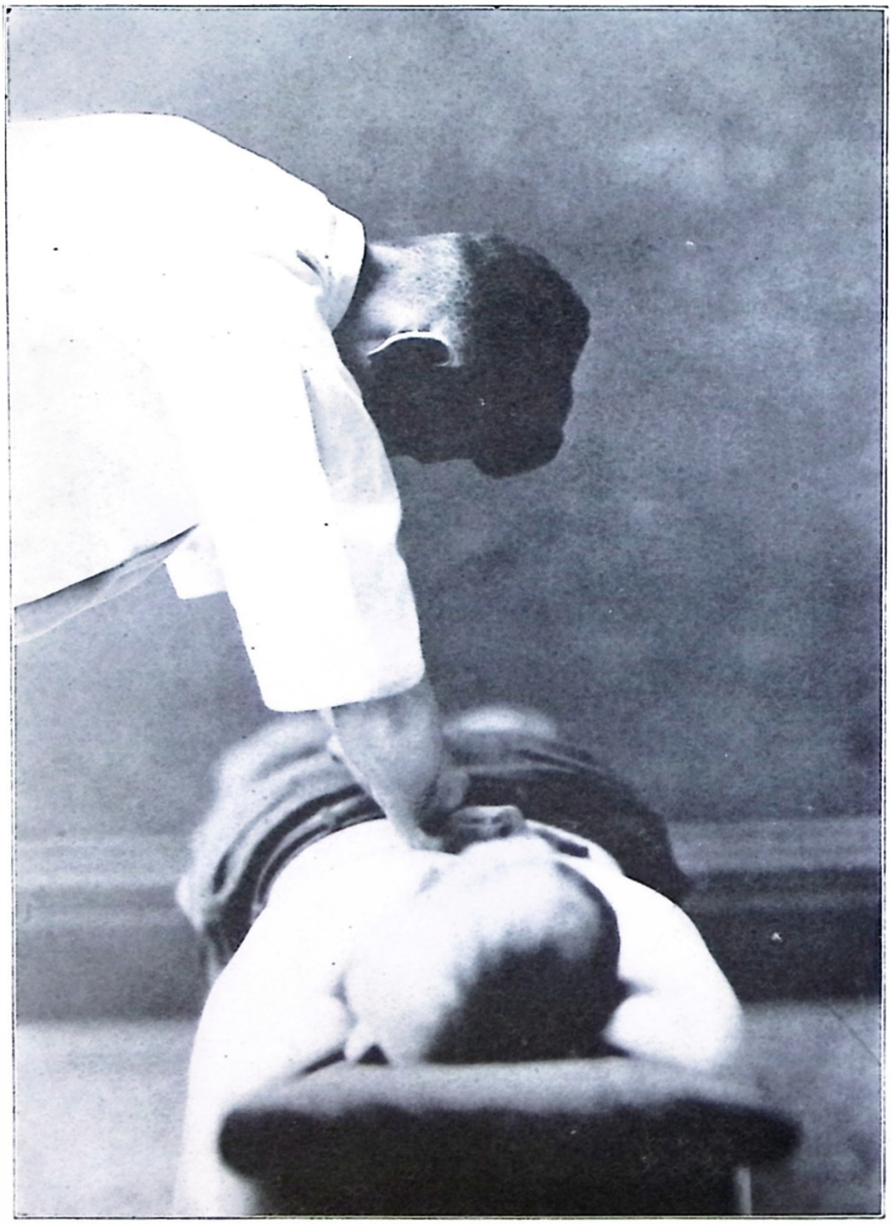

Correct Position for Posterior Right Subluxation of Fifth Lumbar Vertebra with Adjuster Standing on the Right Side

adjuster will find it necessary to lean somewhat across his patient in order to deliver the adjusting force from the median line.

If the adjuster is standing on the left side of the patient, the right hand is used as palpating hand and by the changing of the pointer finger it becomes the nail hand. The same care should be exercised here as on the right side, seeing that the small finger of the nail hand points at right angles to the spine of the patient and that the shoulders and arms are also at right angles. In this event, also, the adjuster should stand well to the superior of the subluxation and lean in such a manner that the episternal notch will be in a perpendicular line drawn from the surface of the back at the point of contact.

Posterior Right Subluxation. In this subluxation, the adjuster should stand on the right side of his patient. It should not be understood that the adjustment cannot be delivered while standing on the left side, but the position obtained by assuming this position is more awkward and it is questionable if the adjustment so given is as effective when the adjuster stands on the right side. Palpation is made with the left hand and the posterior right border of the subluxated vertebra is located with the pointer finger of that hand. This pointer finger is then exchanged for the pointer finger of the right hand with its tip indicating the posterior surface of the spinous process. It is well to draw the loose skin on the patient's back toward the superior in order that the tense skin below the point of contact may aid the adjuster in holding his nail point in the proper position when the adjustment is delivered. The adjuster, in this subluxation, should stand slightly superior to the point of contact because of the curve in the patient's spine at this point. By standing to the superior, he automatically brings the episternal notch to such a position that it is more nearly perpendicular to the spine at the point of contact than it would be if he were standing opposite the vertebra in question. The left hand is now placed as the nail hand, noting that the contact surface of the pisiform bone is resting on the

Cut 66

Correct Position for Posterior Left Subluxation of Fifth Lumbar Vertebra with Adjuster Standing on the Left Side

posterior and right border of the spinous process in question The pointer finger of the right hand is then removed and the right hand is placed as hammer hand, care being taken to see that the pisiform bone is snugly placed in the depression formed by the arching of the nail hand. The small finger of the left hand should form a right angle with the line of the spine.

Here the shoulders and arms will be found to assume a position somewhat oblique to the line of the spine, but very nearly parallel with that line. The adjuster should make no special effort to force the shoulders into an uncomfortable position. Merely let them assume an easy, natural position, but see that the arms are equally bent. The adjuster should lean so that the episternal notch is to the right of a perpendicular line dropped to the spine at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, directing the force downward and to the left.

Posterior Left Subluxation. In this subluxation, the adjuster should stand on the left side of the patient, and the palpation is made with the right hand. The posterior and left surface of the spinous process is located with the pointer finger of the right hand, and this pointer finger is then exchanged for the pointer finger of the left hand. The adjuster here should stand somewhat superior to the point of contact because of the unusual slope that exists between the middle lumbar region and the sacrum. This slope constitutes the lower part of the secondary curve. By standing to the superior, the episternal notch is automatically held more nearly in the perpendicular position as compared with the surface of the spine in this region.

The right hand should now be placed as the nail hand, seeing that the contact surface of the pisiform bone is placed on the left and posterior border of the tip of the spinous process in question. The pointer finger of the left hand is removed and the left hand then becomes the hammer hand, being

placed with the pisiform bone in the groove formed by the arching of the nail hand. The shoulders and arms should be held in an easy, comfortable position, and they will be found extending in a line somewhat obliquely across the patient's spine. No effort should be made, however, to make the shoulders and arms assume a position parallel to the line of the spine. The small finger of the nail hand should form an angle of 90° with the spine and the same care should be taken here as in other positions in this region to see that the skin is made tense, inferior to the point of contact. This is done by drawing the skin toward the superior, and is for the purpose of helping the adjuster to hold his nail hand in the proper contact. Bearing in mind the surface of the back, the adjuster should now lean in such a way that the episternal notch will be posterior and to the left of the point of contact. The relaxation of the arms and shoulders should be carefully noted and the adjustment delivered directing the force downward and toward the right.

Posterior Superior Subluxation. This adjustment may be delivered with the adjuster standing on either side of the patient. If he is standing on the right side, palpation is made with the left hand and the posterior superior border of the spinous process, located with the second finger. This pointer finger is then exchanged for the pointer finger of the right hand and the adjuster steps well to the superior with both legs resting against the patient's body. Care must be taken to see that the adjuster stands far enough toward the superior as the tendency is to make the position difficult of assumption if this is not done. The skin should be drawn from the inferior to minimize the possibility of the pisiform bone slipping on the point of contact. The left hand is placed as nail hand, with the small finger pointing at right angles to the spine and the pointer finger of the right hand is removed and this hand placed as the hammer hand. The shoulders and arms should be held so that they form a right angle to the line of the spine and the adjuster should lean well to the superior and far

Cut 67

Correct Position for Posterior Superior Subluxation of Fifth Lumbar Vertebra with Adjuster Standing on the Right Side

enough across his patient that the episternal notch is brought in line with the median line of the patient's body. In brief, the episternal notch should be held superior to a perpendicular dropped to the spine at the point of contact. After the proper attention is given to the relaxing of the arms and shoulders, the adjustment should be given downward and toward the inferior.

If the adjuster is standing on the left side of the patient, the right hand is the palpating hand, and after the posterior superior surface of the spinous process is located, the pointer finger should be exchanged for the pointer finger of the left hand. The same care should be taken here as in the foregoing subluxations to see that the skin is drawn tense inferior to the point of contact in order to avoid, as far as possible, the danger of a contact point slipping on the back. The right hand is then placed as nail hand with the small finger at right angles to the line of the spine and the adjuster standing well to the superior, with both legs resting against the patient's body. The left hand is then placed as hammer hand, seeing that the pisiform bone rests easily in the groove formed by the arching of the nail hand. The shoulders and arms should be held at right angles to the spine of the patient, and the adjuster should lean to the superior and far enough across the patient that his episternal notch is brought to the median line of the patient's body. In brief, the leaning position should be such that the episternal notch is held superior to a perpendicular line dropped to the surface of the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, directing the force downward and toward the inferior.

Posterior Inferior Subluxation. This subluxation may be adjusted from either side of the patient. If the adjuster is standing on the right side, the left hand becomes the palpating hand, and palpation is made to locate the posterior and inferior border of the spinous process. The pointer finger of the left hand is then changed for the pointer finger of the right

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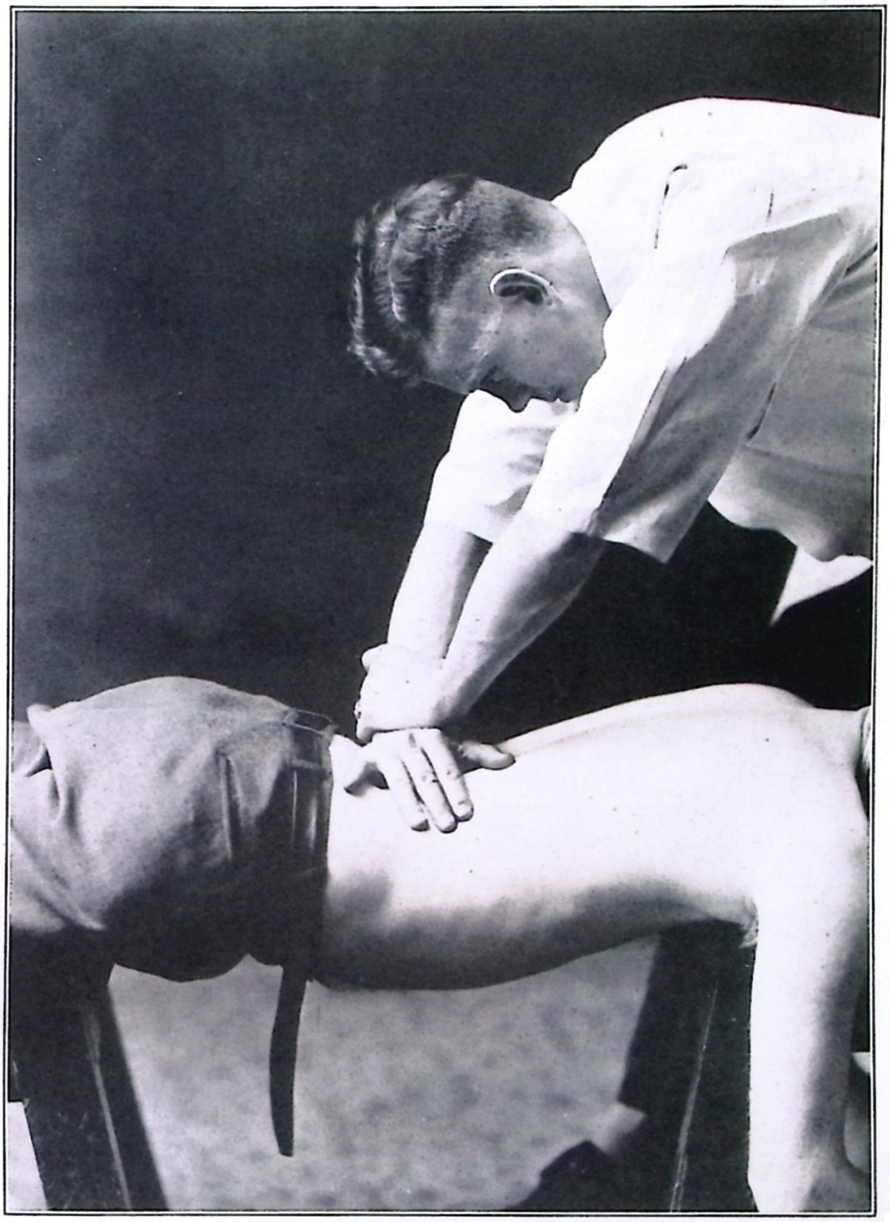

Correct Position for Posterior Superior Subluxation of Fifth Lumbar Vertebra With Adjuster Standing on the Left Side

hand, care being taken to see that the skin is made tense from the inferior in order that the contact point may be more easily held on the spinous process. The adjuster now stands to the superior facing toward the inferior, with both legs resting against the body of his patient. The left hand is placed as nail hand, with the small finger at right angles to the line of the spine and the pointer finger of the right hand is withdrawn. This permits the use of the right hand as hammer hand and it is placed, seeing that the pisiform bone rests easily in the groove formed by the arching of the nail hand. The adjuster should see that the shoulders and arms extend across the spine at right angles, and at the same time he should lean toward the inferior and somewhat across the patient so that the episternal notch is in the median line with the patient's body. This leaning position should bring the episternal notch inferior to a perpendicular line dropped to the surface of the back at the point of contact. In other words, the force of the adjustment is given almost perpendicular to a line dropped to the floor through the contact point. After seeing that the proper relaxation exists, the adjustment should be given, directing the force downward and toward the superior.

If the adjuster is standing on the left side of the patient, the right hand is palpating hand and the posterior inferior border of the spinous process is located with the second finger of the palpating hand.

This pointer finger is then exchanged for the pointer finger of the left hand, care being taken to see that the skin is drawn from the inferior in such a way that it is made tense across the point of contact. This is done in order to avoid the possibility of the contact being lost through slipping when the adjustment is delivered. The right hand is then placed as the nail hand with the small finger forming a right angle with the line of the spine. The pointer finger is withdrawn, permitting the nail point to settle down to its normal position and the left hand is then placed as the hammer hand, care being taken

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Correct Position for Posterior Inferior Subluxation of Fifth Lumbar Vertebra With Adjuster Standing on the Right Side

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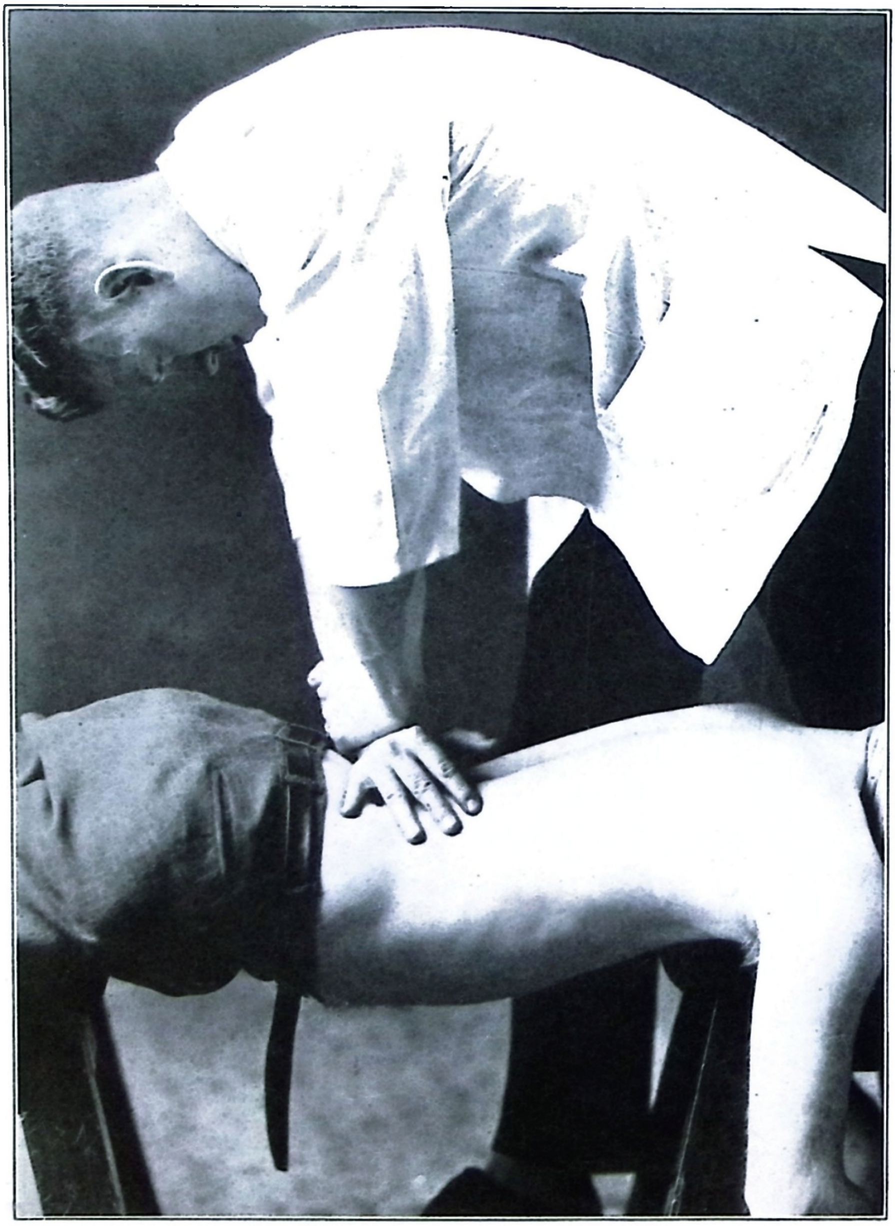

Correct Position for Posterior Inferior Subluxation of Fifth Lumbar Vertebra with Adjuster Standing on the Left Side

to see that the pisiform bone rests snugly in the groove formed by the arching of the nail hand. The shoulders and arms of the adjuster should lie at right angles to the spine of the patient, and the adjuster should lean in such a way that the episternal notch will be inferior to the perpendicular line drawn to the surface of the back at the point of contact. This will mean that the adjuster must be standing to the superior with both legs resting against the body of the patient and leaning far enough across that the episternal notch is in line with the median line of the patient's body.

A perpendicular line from the floor passing through the point of contact should also contain the episternal notch of the adjuster. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered, directing the force downward and to the superior.

Posterior Right Superior Subluxation. In this subluxation the adjuster will find it extremely awkward to stand on the left side of the patient. This for the reason that if he extends the fingers of the nail hand away from his body, his wrist will be cramped when he leans across to get the proper direction of drive. On the other hand, if he turns the fingers so that they point back toward the side on which he is standing, his contact cannot be properly made.

Standing on the right of the patient, palpation is made with the left hand and the posterior right and superior border of the spinous process is located with the second finger of that hand. This finger is then exchanged for the pointer finger of the right hand, care being taken to see that the skin is made tense below the point of contact by drawing the skin upward and toward the right. This is in order that the contact point may be more firmly held in position, and it will decrease the possibility of losing that contact when the adjustment is delivered. The contact point of the pisiform bone of the left hand should now be placed on the posterior right and superior border of the spinous process, with the small finger of the left hand extending as nearly as possible straight away from the

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Correct Position for Posterior Right Superior Subluxation of Fifth Lumbar Vertebra with Adjuster Standing on the Right Side

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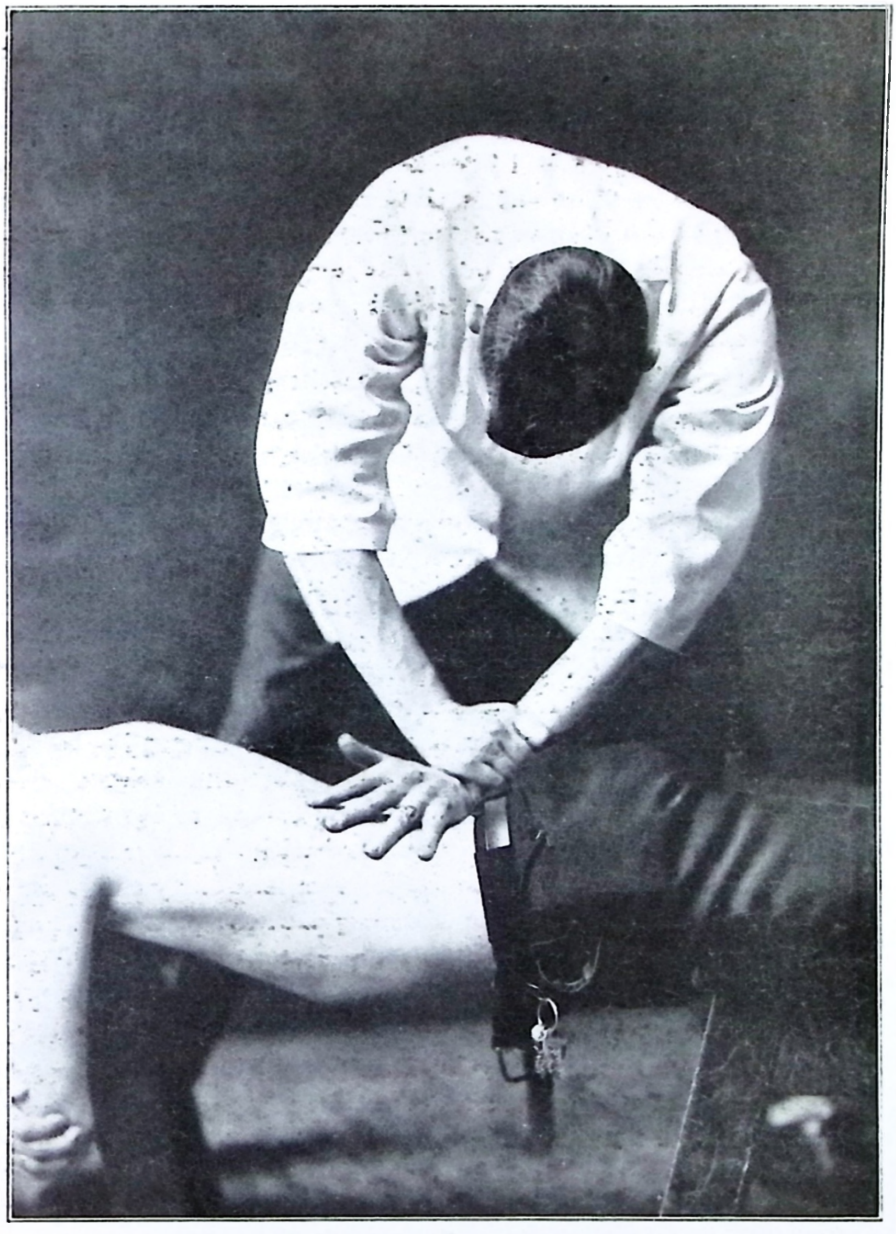

Correct Position for Posterior Right Inferior Subluxation of Fifth Lumbar Vertebra With Adjuster Standing on the Right Side

adjuster. The pointer finger of the right hand is now withdrawn and the adjuster should see that he is standing in line with the line drawn between the spinous process of the vertebra in its abnormal position and the spinous process of the vertebra in the normal position. This will mean that the adjuster must be standing well toward the superior because of the slope of the back extending downward from the sacrum to the middle lumbar region. The adjuster should also be standing well away from his patient in order to get the proper amount of laterality in his position.

The right hand is then placed as the hammer hand, care being taken to see that the pisiform bone rests snugly in the groove formed by the arching of the nail hand. The shoulders and arms, in this position, extend obliquely across the spine, forming with it an angle of approximately 45°. After seeing that the proper relaxation exists, the adjustment is delivered, directing the force from the posterior right and superior and toward the anterior left and inferior.

Posterior Right Inferior Subluxation. This adjustment can be delivered from the left side, but it is not advisable because of the awkward position in which the nail hand is placed. If it is attempted the adjuster will find that the wrist of the nail hand becomes cramped when he is forced to lean across the patient and if the nail hand is turned with the fingers pointing toward the superior, it eliminates the possibility of getting a good contact with the adjusting surface of the pisiform bone.

With the adjuster standing on the right side of the patient, palpation is made with the left hand and the posterior, right and inferior border of the spinous process is located with the pointer finger of that hand. This finger is then exchanged for the pointer finger of the right hand and the adjuster must take care to see that the skin is made tense below the point of contact by drawing the skin upward and toward the right. This is for the purpose of more firmly anchoring the nail point so that the contact will not be lost when the adjustment is delivered. The adjuster should stand opposite the subluxation

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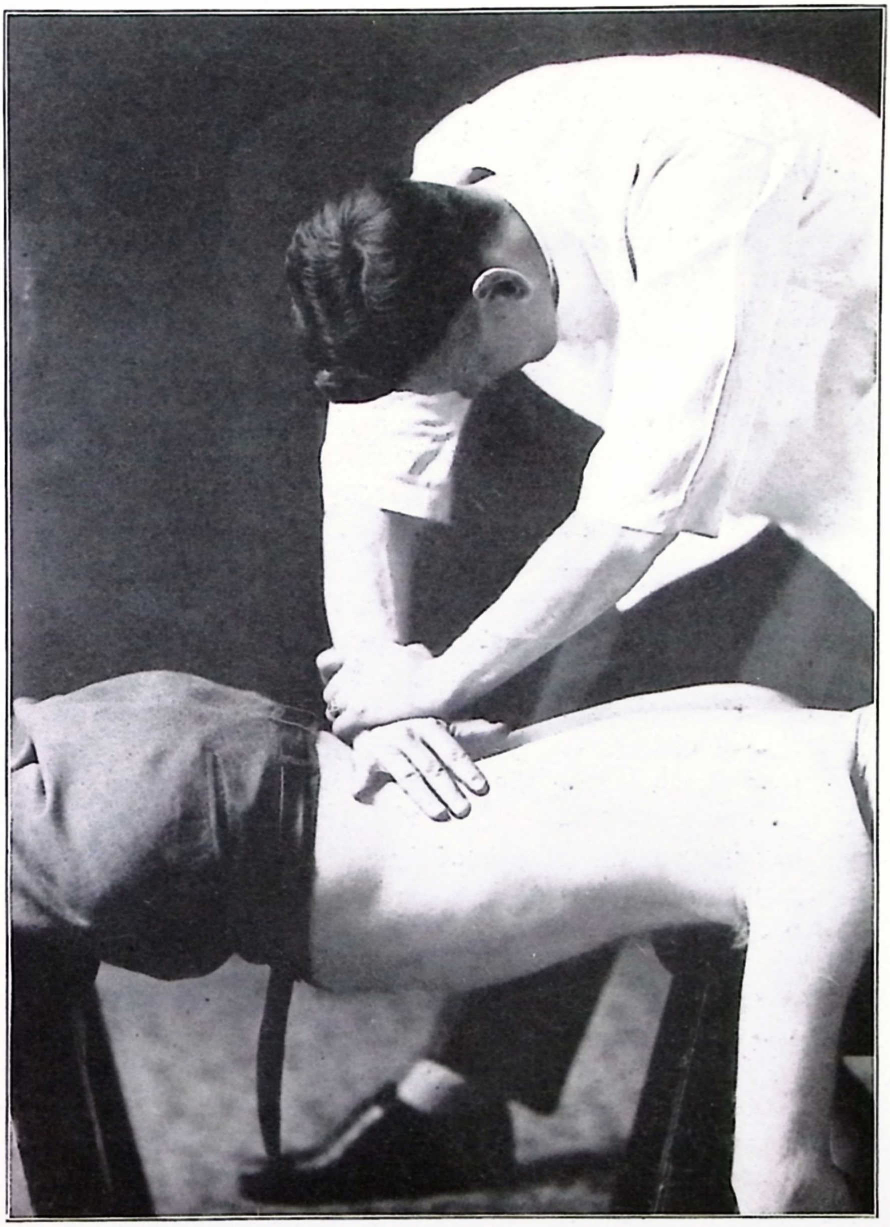

Correct Position for Posterior Left Superior Subluxation of Fifth Lumbar Vertebra With Adjuster Standing on the Left Side

because the slope of the back extending downward from the sacrum to the middle lumbar region gives him a natural inferiority of drive.

The left hand is placed as the nail hand with the small finger pointing directly away from the adjuster. The pointer finger is now withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms, in this position, are parallel with the spine, with the left shoulder somewhat lower than the right and both arms equally bent. The adjuster should lean in such a manner that the episternal notch is to the right and inferior to the perpendicular line extending through the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment should be given, directing the force downward and to the left and superior.

Posterior Left Superior Subluxation. In this subluxation it is possible for the adjuster to stand on the right side of the patient, but if this is done, it forces the adjuster to assume a position wherein the wrist of the nail hand is more or less cramped. This naturally is made more pronounced when the adjuster leans across the patient and destroys to a certain extent the effectiveness of the adjustment.

Standing on the left side of the patient, the right hand is used to make the palpation and the posterior, left and superior border of the spinous process is located with the pointer finger of that hand. This pointer finger is exchanged for the pointer finger of the left hand, seeing that the skin is tightly drawn from the inferior and the right toward the superior and left. The adjuster should stand well to the superior and somewhat out from his patient. He should stand well to the superior because of the slope of the back being downward from the base of the sacrum to the middle lumbar region, and if the superior standing position is not exaggerated, no superiority will be gained. The right hand is then placed as the nail hand, with the small finger pointing directly away from the adjuster. The

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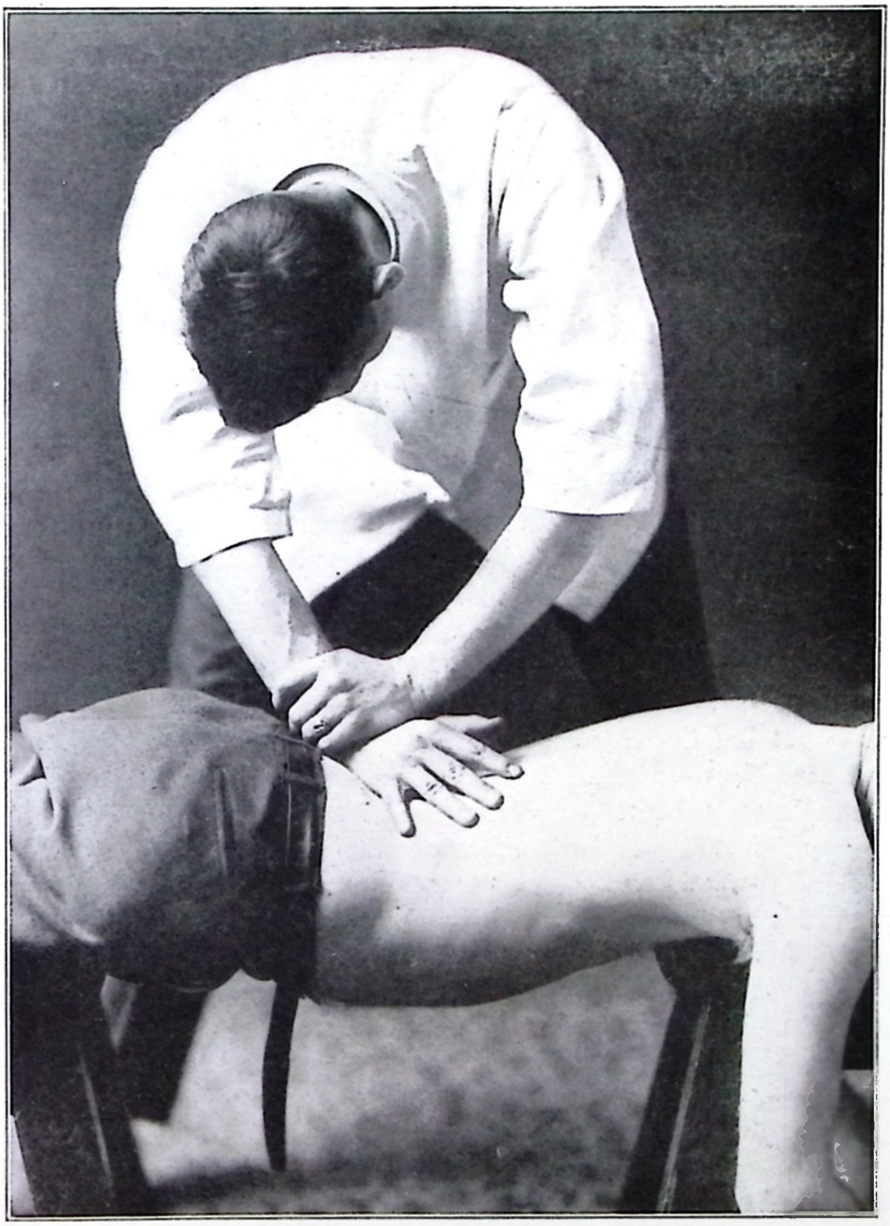

Correct Position for Posterior Left Inferior Subluxation of Fifth Lumbar Vertebra With Adjuster Standing on the Left Side

pointer finger of the left hand is now withdrawn and the left hand is placed as the hammer hand. Care should be taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The adjuster must lean well to the superior and somewhat out from his patient, in order that the episternal notch may be superior and to the left of a perpendicular dropped to the surface of the back at the point of contact. After seeing that the arms and shoulders are thoroughly relaxed, the adjustment is delivered, directing the force downward toward the right and inferior.

Posterior Left Inferior Subluxation. In this subluxation the adjuster may stand on the right side of the patient, but this is not advisable because of the cramped position in which the nail hand is placed when it is attempted. Particularly when the adjuster is leaning across his patient to obtain the laterality it is almost impossible to hold the contact point in the correct position and in contact with the vertebra.

Standing on the left side of the patient, the right hand is used as the palpating hand and the posterior left and inferior border of the spinous process is located with the second finger of that hand. This pointer finger is then exchanged for the pointer finger of the left hand, care being taken to see that the skin is stretched tightly from the inferior and right. The adjuster should stand directly opposite the subluxation. If he stood toward the inferior the adjuster would very likely permit his contact point to slip on the spine when the adjustment was delivered. The right hand is now placed as the nail hand with the small finger extending directly away from the adjuster. The pointer finger is withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. In this position the shoulders and arms will naturally assume a direction parallel with the spine, with the right shoulder somewhat lower than the left and his body leaning inferior. He should permit the shoulders and arms to assume the most natural position and should see that both

arms are equally bent. The leaning position is such that the episternal notch is left and inferior to the perpendicular drawn to the surface of the back at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered downward and toward the right and superior.

General Considerations Involving the Above Subluxations. It will be noted that in three of the above positions the adjuster stands toward the superior, facing the inferior, with the shoulders at right angles to the patient's spine. These are in the posterior PS and PI subluxations. This is for the reason that the slope of the back, from the sacrum to the middle lumbar region is very acute. If the adjuster were to stand directly opposite the point of contact, with the shoulders parallel with the line of the spine, and if he should lean in such a manner that his force would be directed from the superior, posterior or inferior, he would find that in that position he could not utilize to the best advantage the weight of his body. This is true in any position where the weight of the body is not directly in line with the subluxation.

On the three lettered subluxations of the above group, it will be noted that in those containing superiority the standing position and leaning position are exaggerated toward the superior, while in the inferior subluxations the inferior standing and leaning positions are minimized. This is also because of the acute curve which is present in the back from the sacrum to the middle lumbar region and which is exaggerated by the fact that the patient is suspended between the two adjusting tables.

RECOIL ADJUSTMENT OF SACRUM

Base Posterior. In this subluxation the adjuster may stand on either side of the patient. If upon the right side, the palpation is made with the left hand and the first tubercle is located with the pointer finger of that hand. The pointer finger is then exchanged for the pointer finger of the opposite

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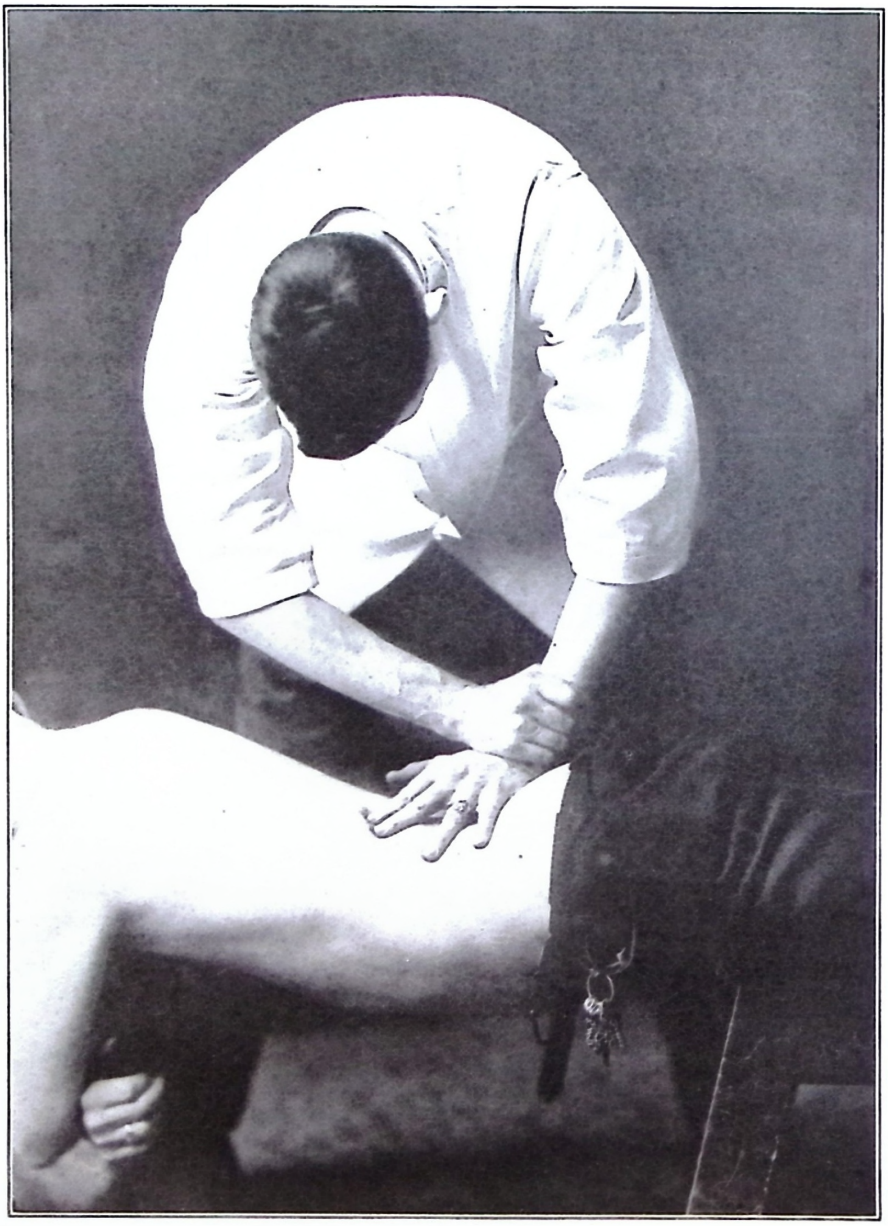

Correct Position for Base of Sacrum Posterior With Adjuster Standing on the Right Side

hand, and the left hand becomes the nail hand. The skin is drawn tightly across the point of contact and the pisiform bone of the left hand is placed with its contact point upon the posterior tip of the first tubercle. The adjuster should stand directly opposite the point of contact and the small finger of the left hand should form a right angle with the line of the spine. The pointer finger of the right hand is then withdrawn, the right hand placed as hammer hand, care being taken to see that the pisiform bone rests snugly in the groove formed by the arching of the nail hand. The shoulders and elbows are held in a line parallel to the line of the spine and the adjuster should lean in such a manner that the episternal notch lies in the perpendicular drawn to the surface of the back through the point of contact.

If the adjuster is standing on the left side of the patient, the right hand is used as palpating hand and the posterior surface of the first tubercle on the sacrum is located with the pointer finger. The adjuster should stand directly opposite the point of contact and the skin should be made tense by drawing it across the point of contact. The pointer finger is then exchanged for the pointer finger on the opposite hand and nail point one of the right hand is then placed on the posterior surface of the first tubercle. The arms and shoulders in this position should be parallel to the line of the spine and the small finger of the nail hand should be held at right angles to the spine. The pointer finger should be withdrawn and the left hand then used as the hammer hand. The pisiform bone should be carefully placed in the groove formed by the arching of the nail hand and the wrist of the nail hand should be firmly grasped by the fingers and thumb. The adjuster should lean in such a manner that the episternal notch is in line with a perpendicular line dropped to the surface of the back through the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force straight from the superior.

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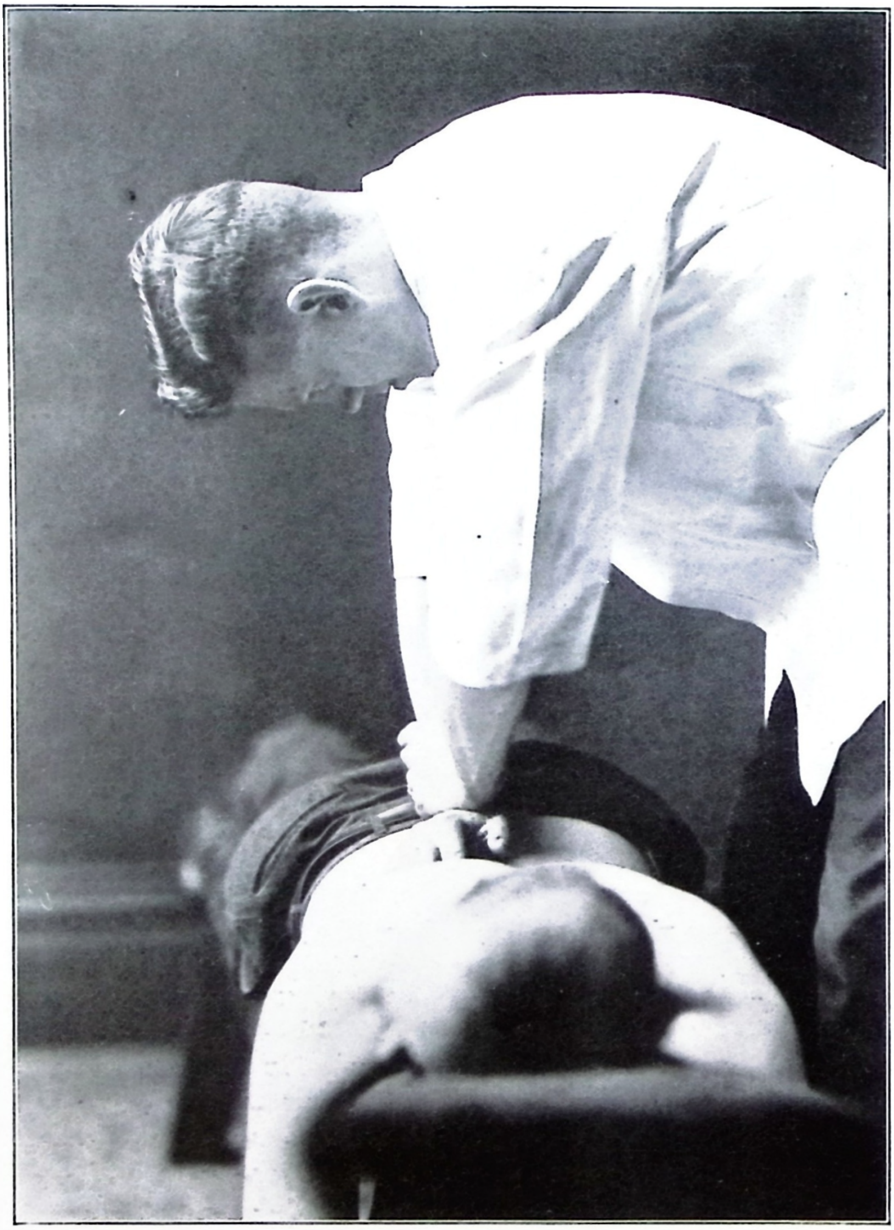

Correct Position for Sacrum Base Posterior on the Right With Adjuster Standing on the Left Side

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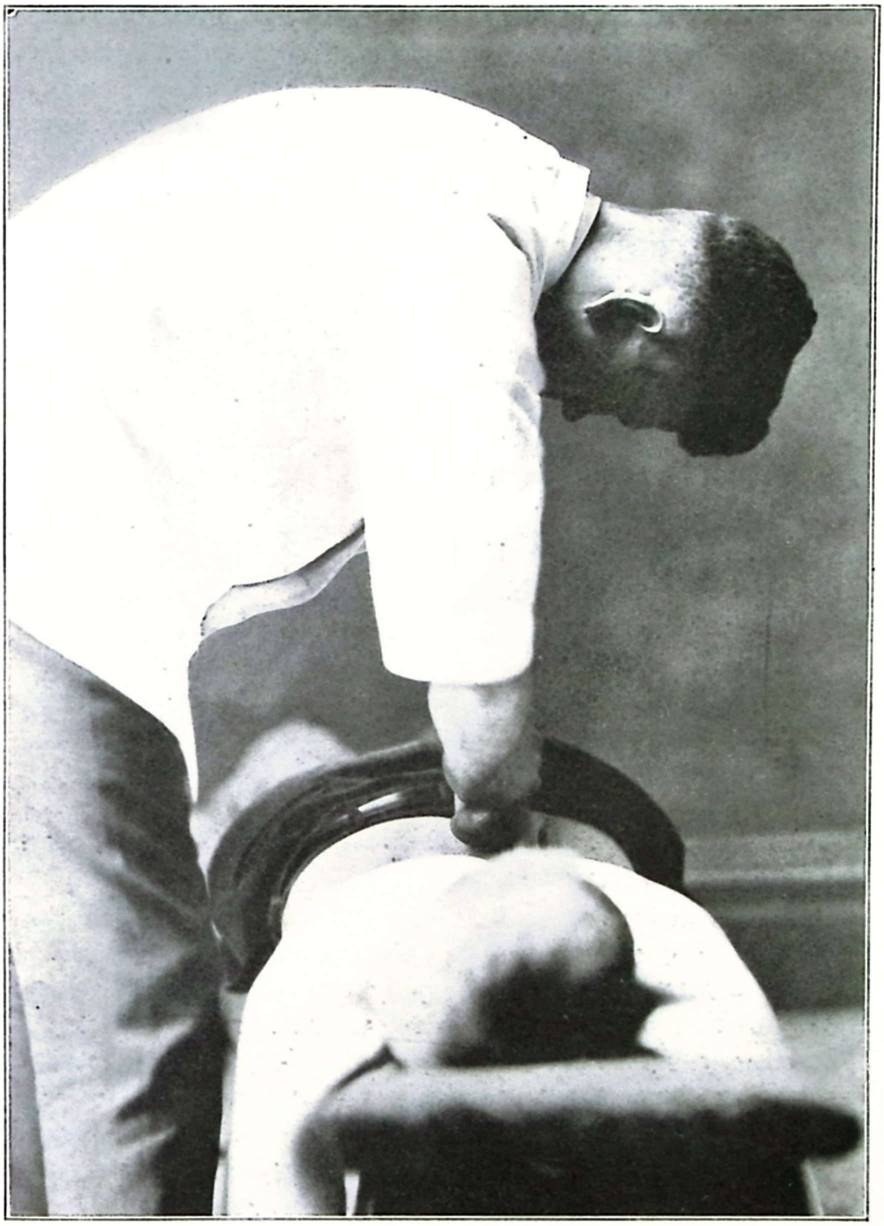

Correct Position for Sacrum Base Posterior on the Left With Adjuster Standing on the Right Side

Base Posterior on the Right. In this subluxation the adjuster should stand on the left side of the patient.. Palpation is made with the right hand and the first tubercle on the sacrum is located with the second finger of the palpating hand. From this point the first finger is used to measure toward the right about one and one-half inches to a point just inside the articulation between the sacrum and the right ilium. The second finger should now be removed and the first finger of the palpating hand exchanged for the pointer finger of the opposite hand. Nail point one of the right hand is now placed, with the adjuster standing directly opposite the point of contact and with the small finger of the nail hand extending toward the right and superior. This turning of the nail hand for this contact is advisable in order to avoid the possibility of nail point two coming in contact with the crest of the right ilium. The pointer finger is now removed and the left hand placed as the hammer hand. Care should be taken to see that the pisiform bone is placed in the groove formed by the arching of the nail hand and that the nail hand wrist is grasped by the thumb and fingers. The adjuster should lean in such a manner that the episternal notch is in line with a perpendicular dropped to the surface of the back at the point of contact. After noting that the proper relaxation exists in the arms and shoulders, the adjustment is delivered directing the force straight from the posterior.

Base Posterior on the Left. In adjusting this subluxation the adjuster should stand on the right side of the patient and thus the left hand becomes the palpating hand. Palpation is made and the first tubercle on the sacrum is located with the second finger of that hand. Keeping this finger in contact, the first finger measures toward the left about one and one-half inches to a point just inside the articulation between the sacrum and the left ilium. The second finger is now removed and the first finger of the left hand is exchanged for the pointer finger of the right hand. Nail point one of the left hand is now placed upon the point indicated by the pointer finger,

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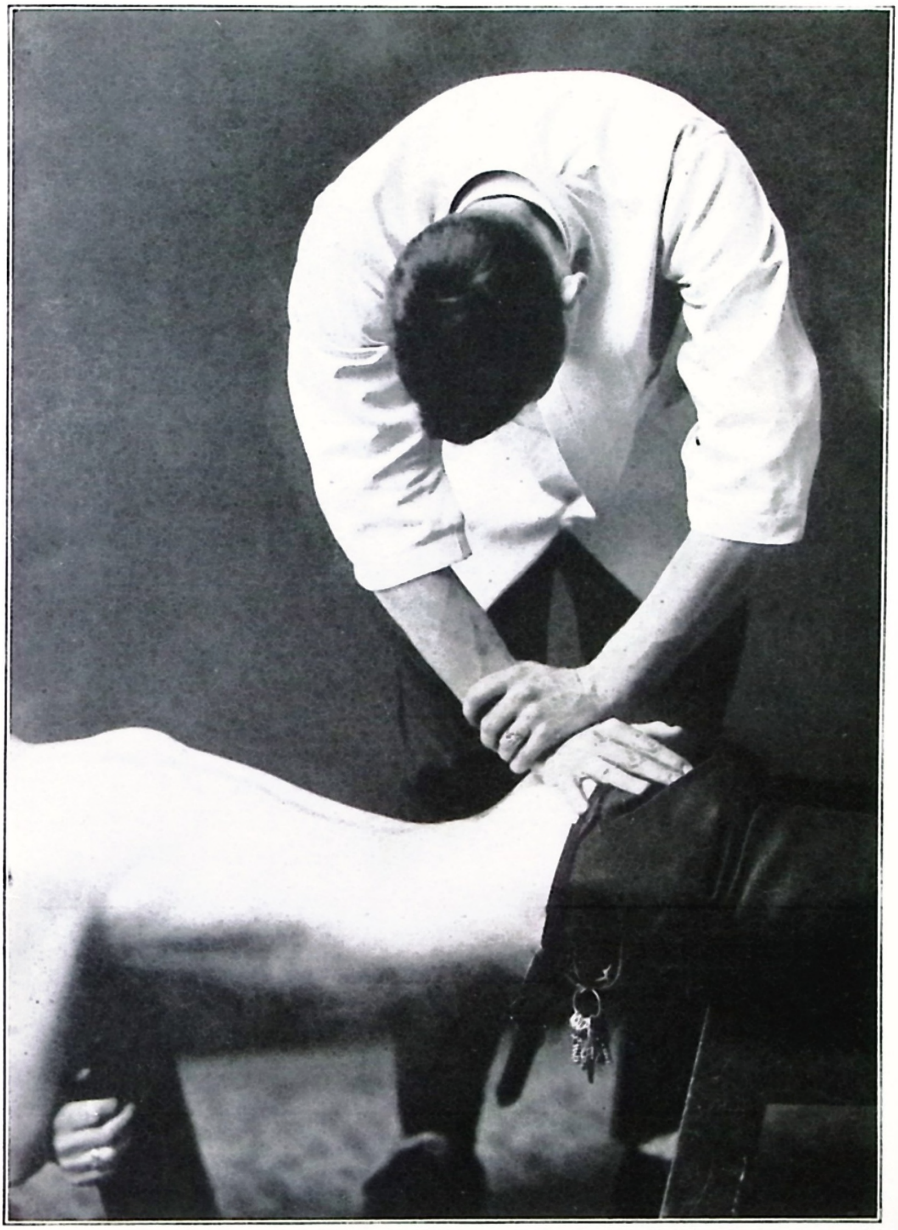

Correct Position for Sacrum Apex Posterior With Adjuster Standing on the Right Side

with the small finger directed toward the left and superior in order to avoid allowing the nail point two to come in contact with the crest of the ilium. The pointer finger of the right hand is withdrawn and that hand is then placed as hammer hand, care being taken to see that the pisiform bone is snugly placed in the groove formed by the arching of the nail hand. The shoulders, in this position, are parallel to the spine of the patient. The adjuster should see that he is leaning in such a manner that the episternal notch lies in the perpendicular drawn to the surface of the back at the point of contact. After seeing that the proper relaxation exists, in the arms and shoulders, the adjustment is delivered, directing the force straight from the posterior.

Sacrum Apex Posterior. This subluxation may be adjusted from either side of the patient. If the adjuster is standing on the right side, the left hand becomes the palpating hand and either the fourth or the fifth segment of the sacrum becomes the point of contact. This depends entirely on the contour of the posterior sacral surface. If there is a marked angle between the third and fourth segments, difficulty may be experienced in placing the contact on the last sacral segment. But if the sacrum shows less degree of convexity the pisiform bone may be placed upon the last segment without any difficulty being experienced in holding that contact.

After locating the point of contact on the surface of the sacrum with the second finger, the first and third fingers are removed and the palm of the hand lowered toward the surface of the back. The adjuster should stand opposite the point of contact and the nail point one of the right hand should be placed on the contact surface. The small finger of the nail hand should form a right angle with the line of the spine and when this is done the pointer finger should be removed and the left hand is placed as the hammer hand. The shoulders and arms should be held so that they are parallel to the line of the spine, with the arms equally bent. The adjuster should lean so that the episternal notch is in line with a perpendicular

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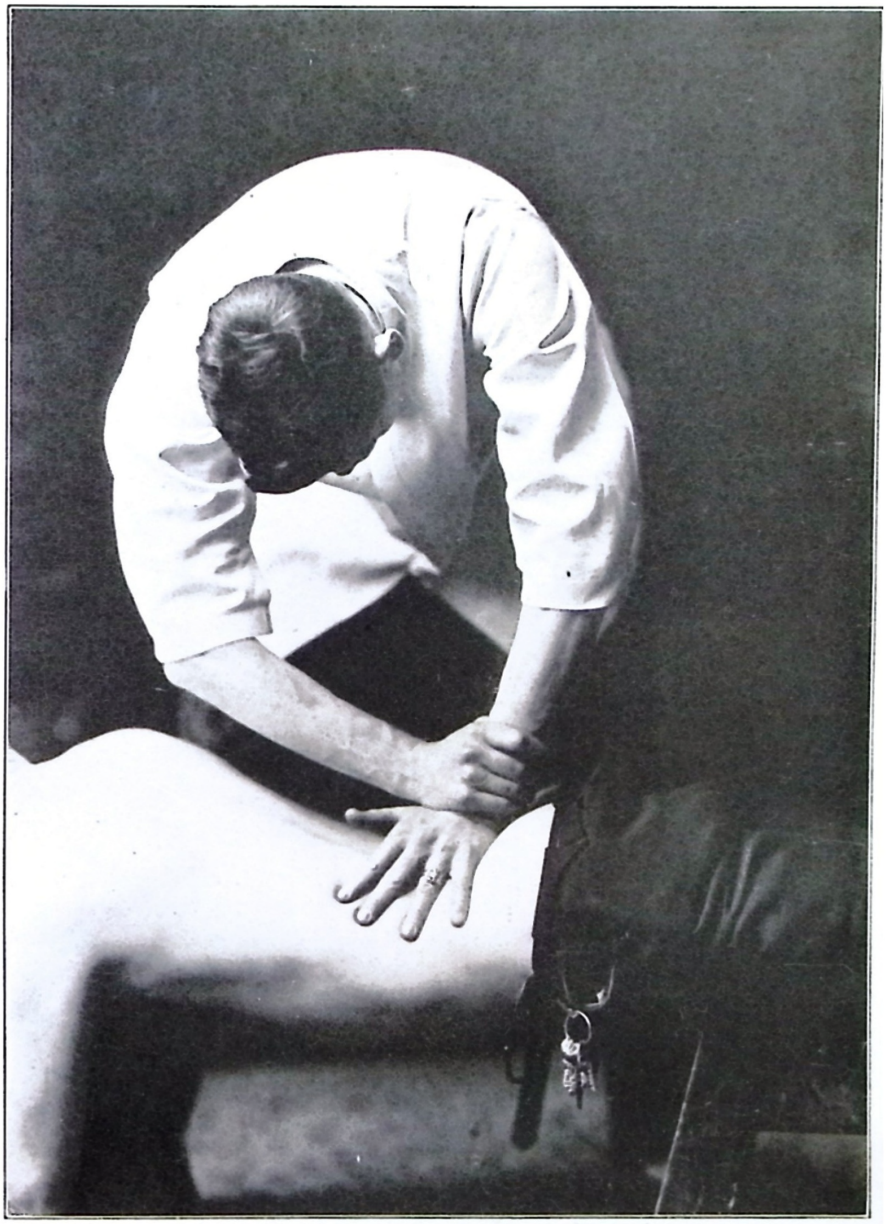

Correct Position for Left Ilium Posterior

drawn to the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered directing the force straight downward.

If the adjuster is standing on the left side of the patient, the right hand becomes the palpating hand and the fourth or fifth segment of the sacrum is located with the pointer finger of that hand. Everything is now removed except the pointer finger and the palpating hand is lowered to the surface of the back, with the pointer finger still maintaining its contact. Nail point one of the left hand is now placed as the nail hand, with the small finger forming an angle of approximately 90° with the line of the spine. The shoulders and arms are held parallel to the spine, with the arms equally bent. The adjuster should lean in such a manner that the episternal notch is in the perpendicular drawn to the surface of the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force straight downward.

RECOIL ADJUSTMENT FOR THE ILII.

Left Ilium Posterior. In this subluxation the adjuster should stand on the right side of the patient, palpating down the spine until he locates the tubercle on the second segment of the sacrum with the second finger of the palpating hand. With the first finger of the palpating hand he now measures toward the left about one and one-half inches or to the line of articulation between the sacrum and the left ilium. Here he will find the posterior superior spine of the ilium which is the posterior termination of the crest. The above is given as an approximation, and it must be understood that the posterior superior spine is not always located at the same level as the second tubercle of the sacrum. It may be found slightly below or slightly above this point, but its exact location can be determined by the first finger of the palpating hand when the measurement is made. After locating the posterior superior spine of the left ilium, the first finger should be moved toward

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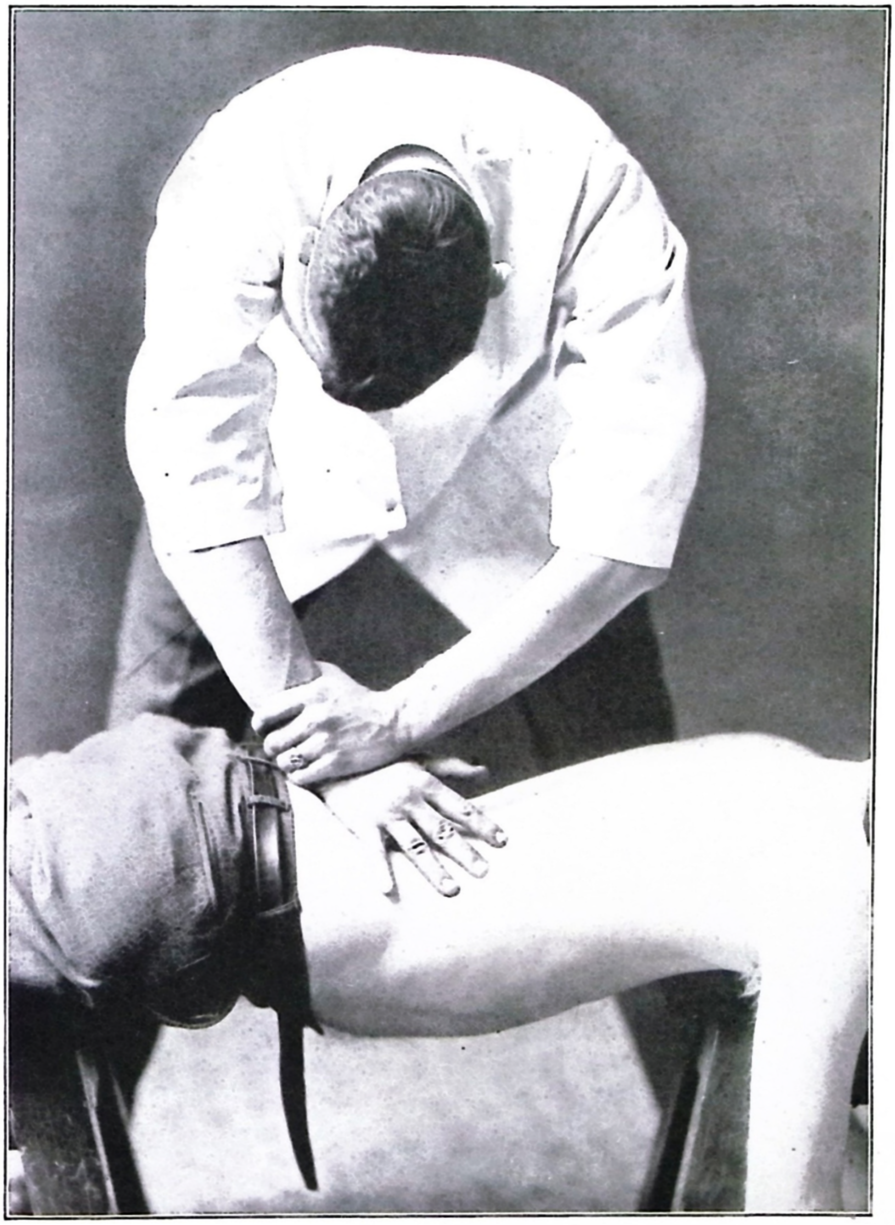

Correct Position for Right Ilium Posterior

the superior about one inch in order to locate the proper point of contact. This is done because the posterior superior spine does not show the same degree of prominence as does the crest of the ilium slightly above this point.

The first finger of the left hand is now exchanged for the pointer finger of the right hand. The left hand now becomes the nail hand and is placed with the contact surface of the pisiform bone upon the posterior right border of the crest at the point of contact. The small finger of the nail hand should form an angle of 90° with the line of the spine. The pointer finger of the right hand is now removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held parallel to the line of the spine, with the arms equally bent. The adjuster should now lean so that the episternal notch is to the right of a perpendicular drawn to the surface of the back at the point of contact. This is done because the anterior surface of the sacrum is much wider than the posterior surface and as a consequence the line of articulation is on an oblique angle rather than in the perpendicular. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force downward and toward the left.

Right Ilium Posterior. In this subluxation the adjuster should stand on the left side of the patient, palpating down the spine until the second finger of the right hand locates the tubercle on the second segment of the sacrum. With the first finger of the palpating hand he now measures toward the right about one and one-half inches, or to the line of articulation between the sacrum and the right ilium. Here he will find the posterior superior spine of the ilium, which is the posterior termination of the crest. This is an approximation and it should be understood that the posterior superior spine is not always found at the same level as the second tubercle of the sacrum. It may be slightly below or slightly above

this point, but its exact location can be determined by the first finger of the palpating hand when the measurement is made. After locating the posterior superior spine of the right ilium, the first finger should be moved toward the superior about one inch in order to locate the proper point of contact. This is done because the posterior superior spine does not show the same degree of prominence as does the crest of the ilium slightly above this point.

The first finger of the right hand is now exchanged for the pointer finger of the left hand. The right hand now becomes the nail hand and is placed with the contact surface of the pisiform bone upon the posterior left border of the crest at the point of contact. The small finger of the nail hand should form an angle of 90° with the line of the spine. The pointer finger of the left hand is now removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove made by the arching of the nail hand. The shoulders and arms should be held parallel to the line of the spine, with the arms equally bent. The adjuster should now lean so that the episternal notch is to the left of a perpendicular drawn to the surface of the back at the point of contact. This is done because the anterior surface of the sacrum is much wider than the posterior surface, and as a consequence the line of articulation is on an oblique angle rather than in the perpendicular. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force downward and toward the right.

Left Ilium Posterior Superior. In this subluxation the adjuster should stand on the right side of the patient, using the left hand as the palpating hand. The second tubercle on the sacrum is located with the second finger of that hand, and from this point measurement is made about one and one-half inches to the left with the first finger to the line of articulation between the sacrum and the left ilium. The first finger thus locates the posterior and superior spine of the left ilium, and

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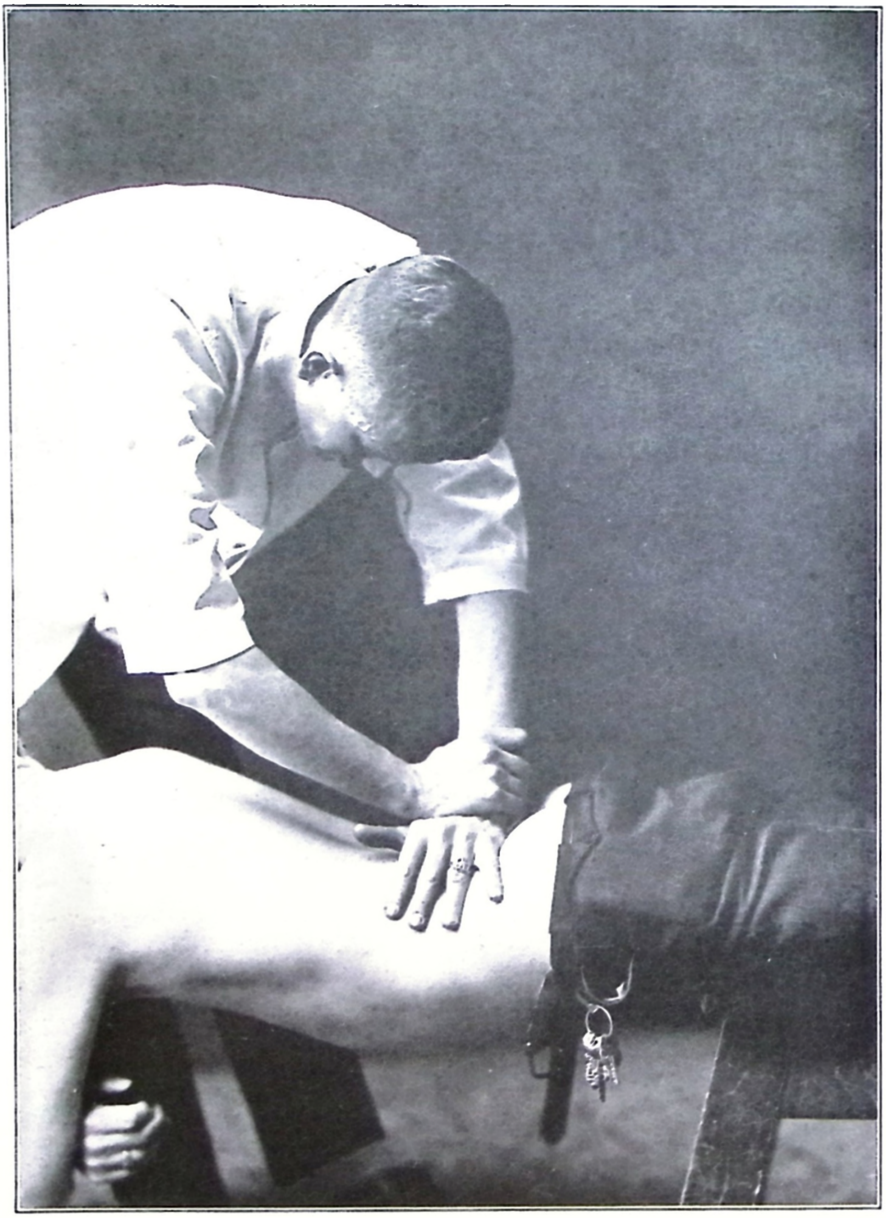

Correct Position for Left Ilium Posterior-Superior

from this point measurement is made about one and one-half inches toward the superior along the crest of the left ilium. This is done for the reason that a contact cannot be made from the posterior superior spine itself without the adjuster slipping off the contact when the adjustment is delivered from the superior. The first finger of the left hand is now exchanged for the pointer finger of the right hand, and the left hand now becomes the nail hand. The adjuster should stand superior to the point of contact and the nail point one of the left hand is placed upon the posterior right border of the crest of the ilium. The small finger of the left hand should form an angle of approximately 90° with the line of the spine.

The pointer finger of the right hand is now withdrawn and the right hand now placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms lie obliquely across the spine, with the arms equally bent. The adjuster leans so that the episternal notch is to the right and superior of a perpendicular drawn through the contact point. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered; directing the force downward and toward the left and inferior.

Right Ilium Posterior Superior. In this subluxation the adjuster should stand on the left side of the patient, using the right hand as the palpating hand. With the palpating hand, the tubercle on the second segment of the sacrum is located with the second finger. Measurement is then made toward the right about one and one-half inches by the first finger of the palpating hand. This measurement brings the first finger to the line of articulation between the sacrum and the ilium and in contact with the posterior superior spine. From this point the first finger measures toward the superior about one and one-half inches along the crest of the ilium. The first finger of the right hand is now exchanged for the pointer finger of the left hand. The adjuster should stand well to the superior and should place the right hand as nail hand, seeing that

the small finger forms an angle of approximately 90° with the line of the spine. The pointer finger of the left hand is now removed, permitting the contact surface of the pisiform bone to settle down upon the posterior left border of the crest of the ilium. The left hand is then placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms extend obliquely across the spine and the arms should be equally bent. The adjuster should lean in such a manner that the episternal notch is superior and to the left of a perpendicular drawn to the surface of the patient's back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered directing the force downward and toward the right and inferior.

RECOIL ADJUSTMENT OF THE SIXTH AND SEVENTH CERVICAL AND FIRST DORSAL VERTEBRAE.

Posterior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but the patient's face must be turned toward the side on which the adjuster is standing. This for the reason that if the face were turned in the opposite direction, difficulty would be experienced in properly anchoring the fingers of the nail hand. With the face, however, turned toward the adjuster, the fingers may be placed around the patient's neck or on the occiput, and thus a firm foundation established.

With the adjuster standing on the right side, the patient's face should be turned toward the right and the palpation is made with the left hand. The second finger of the left hand should locate the posterior surface of the spinous process tip and the adjuster should then step to the superior, facing the inferior and with both legs resting against the adjusting table.

The pointer finger of the left hand is now exchanged for the pointer finger of the right hand, care being taken to see

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Correct Position for Right Ilium Posterior Superior

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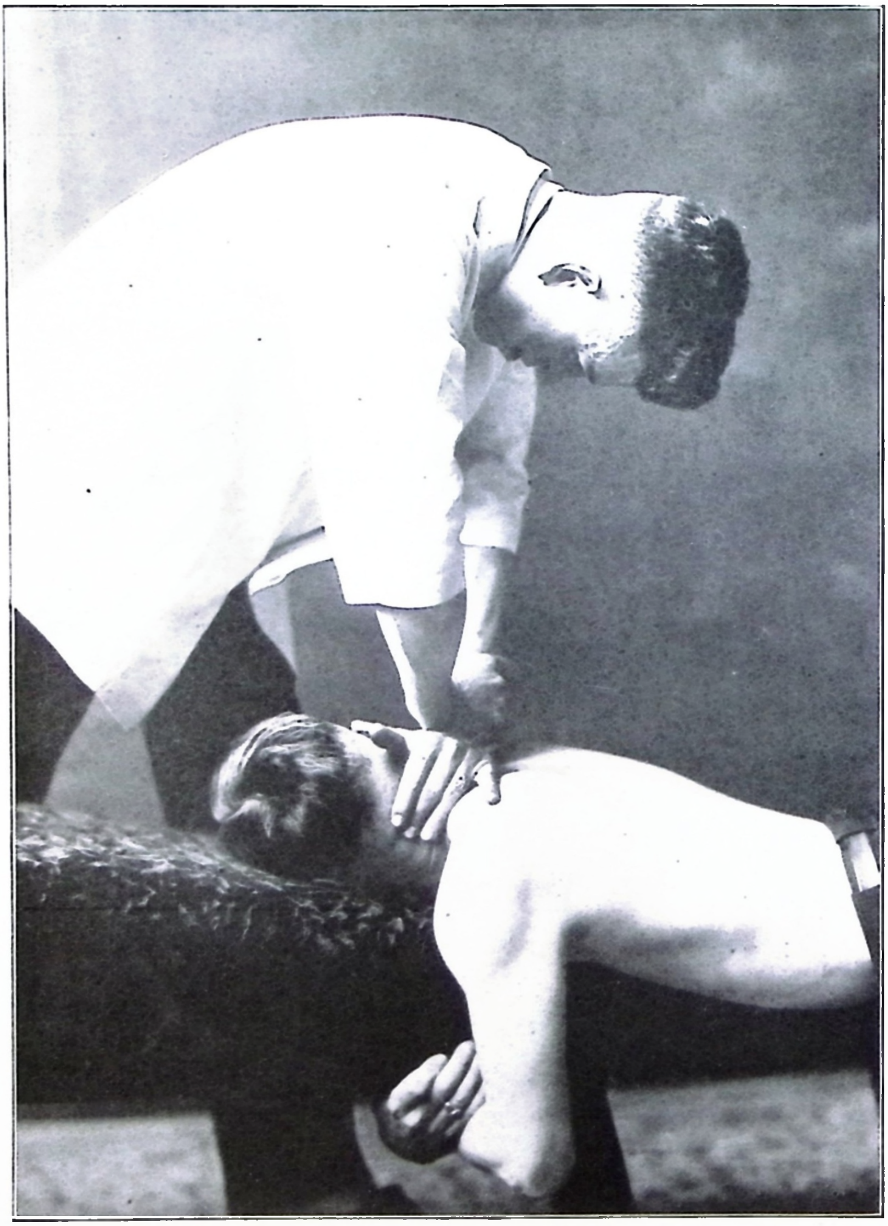

Correct Position for Posterior Subluxation of Seventh Cervical Vertebra with Adjuster Standing on the Right Side

that the skin is drawn from the inferior toward the superior and toward the right side of the spinous process. This is for the reason that the back slopes down from the second dorsal to the middle cervical region, and if any slipping takes place it is apt to be toward the superior. The left hand is now placed as the nail hand with the contact surface of the pisiform bone on the posterior surface of the spinous process tip. The fingers of the nail hand should not be held stiff, but should be permitted to extend easily around the patient's neck, thus forming a brace that the contact may be more efficiently maintained. The thumb of the nail hand should extend toward the superior behind the pinna of the ear, but not in contact with the mastoid process of the temporal bone. The right hand should be placed as the hammer hand after withdrawing the second finger from its point of contact on the spinous process. Care should be taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. In this position, the shoulders and arms are held approximately at right angles to the line of the spine, with the arms equally bent. The adjuster should lean somewhat across the patient because of the fact that the spinous processes are rotated toward the left when the patient's face is turned to the right. He should be careful, however, that the episternal notch is neither superior nor inferior to a perpendicular drawn to the surface of the back at the point of contact.

If the adjuster is standing on the left side of the patient, he should see that the patient's face is turned toward the left. Palpation is now made with the right hand, and the posterior surface of the spinous process tip is located with the second finger of that hand. This pointer finger is then exchanged for the pointer finger of the left hand, care being taken to see that the skin is drawn from the inferior toward the superior and across the point of contact toward the left. This for the reason that if the slipping occurs it will be toward the middle cervical group. By stretching the skin in this manner, the adjuster is enabled to hold the contact more firmly than he oth-

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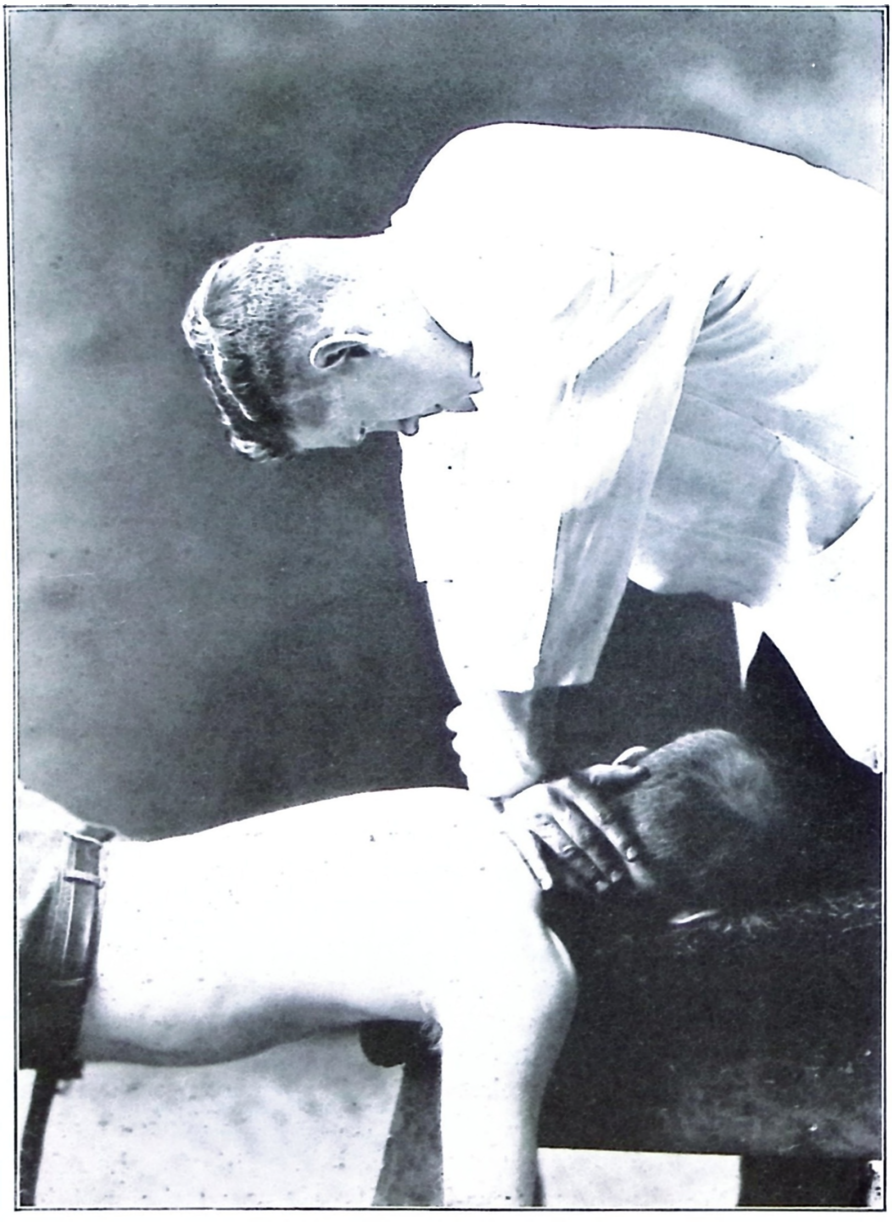

Correct Position for Posterior Subluxation of Seventh Cervical Vertebra With Adjuster Standing on the Left Side

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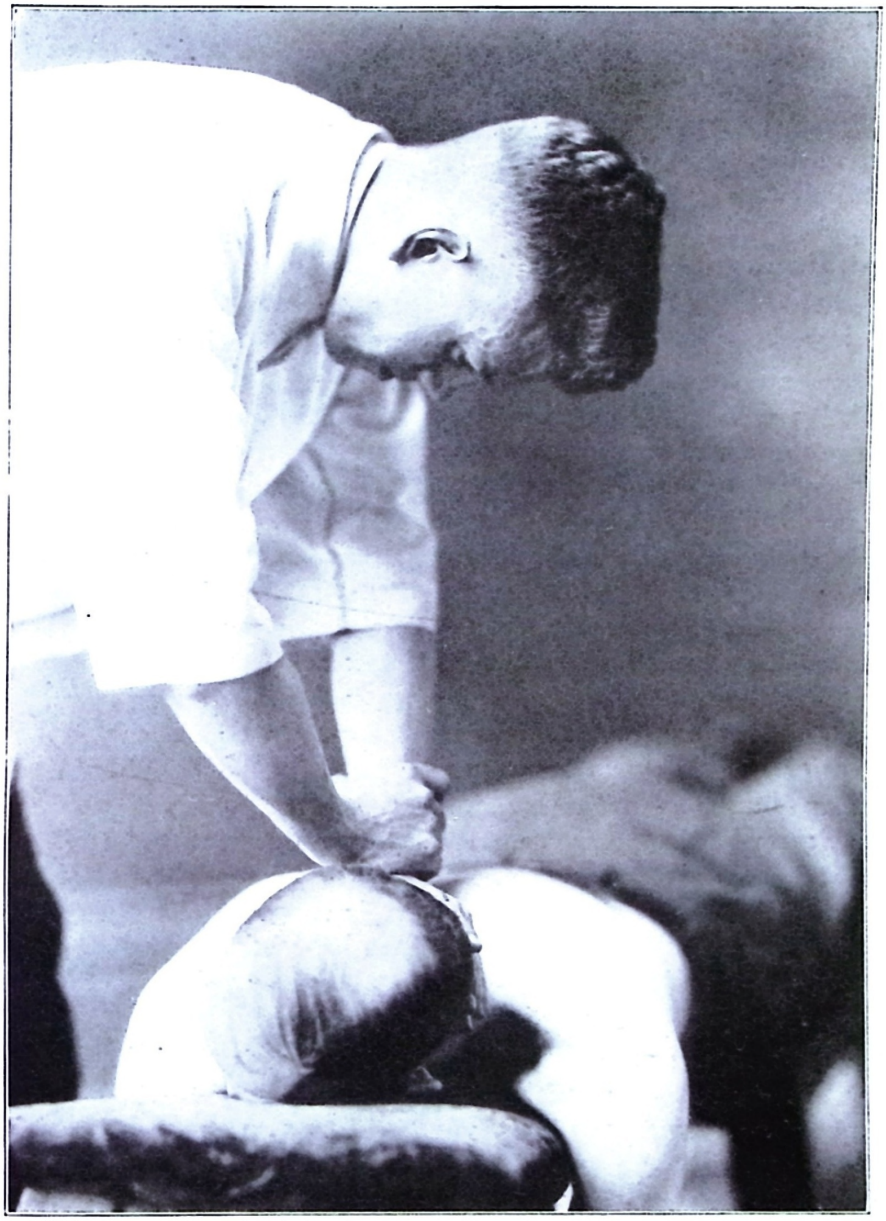

Correct Position for Posterior Right Subluxation of Seventh Cervical Vertebra

erwise could. The right hand is now placed as the nail hand, with the contact surface of the pisiform bone resting on the posterior surface of the spinous process. The adjuster should see that the fingers of the nail hand are not held stiff, but should be allowed to rest easily around the neck and occiput of the patient. The thumb of the nail hand should extend straight toward the superior behind the pinna of the ear, although not in direct contact with the mastoid process of the temporal bone.

The adjuster should stand well to the superior, facing the inferior and with both legs resting against the side of the adjusting table. The pointer finger of the left hand is now withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held across the spine of the patient, forming an angle of 90° with the line of the spine. The episternal notch should be somewhat to the right of a perdendicular line drawn to the surface of the back at the point of contact. This is for the reason that the spinous process of the lower cervical and upper dorsal vertebrae are rotated to the right when the face of the patient is turned toward the left. Care should be taken, however, to see that the episternal notch is neither superior or inferior to the perpendicular drawn to the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force downward and somewhat toward the left.

Posterior Right Subluxation. In this subluxation the adjuster should stand on the right side of the patient, with the patient's face turned toward the right. Palpation is made in the usual manner with the palpating fingers of the left hand and the posterior right border of the spinous process is located with the tip of the second finger. The adjuster should stand a trifle superior to the point of contact depending on the degree of curvature between the second dorsal vertebra and the middle cervical region. It must be remembered that the slope

of the back is downward from the second dorsal to the middle cervical region, and it is for this reason that the adjuster finds it expedient to change hands. The pointer finger of the left hand is now exchanged for the pointer finger of the right hand, care being taken to see that the tip of the pointer finger is on the right border of the spinous process to be adjusted. The skin should also be drawn tense from the inferior toward the superior, because if any slipping takes place it will be from the inferior, and this procedure will tend to eliminate that possibility. The left hand is placed as the nail hand, using the contact surface of the pisiform bone and bringing it in contact with the posterior right border of the spinous process. The fingers of the nail hand should be directed well towards the superior in this position and the palm of the nail hand should be held fairly flat, although not in direct contact with the surface of the neck. The thumb of the nail hand should extend straight forward and toward the superior behind the pinna of the ear, although not in direct contact with the mastoid process of the temporal bone. The pointer finger of the right hand is now removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms are held so that they lie obliquely across the spine, although very nearly parallel. Because the face of the patient is turned toward the adjuster, the upper dorsal and lower cervical vertebrae are rotated with their spinous processes toward the left of the median line of the body. Therefore, the adjuster should lean so that the episternal notch is directly posterior to the surface of the back at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered, directing the force perpendicular to the back at the point of contact.

Posterior Left Subluxation. In this subluxation the adjuster stands on the left side of the patient, with the patient's face turned toward the left. Palpation is made with the right hand and the posterior left border of the spinous process is

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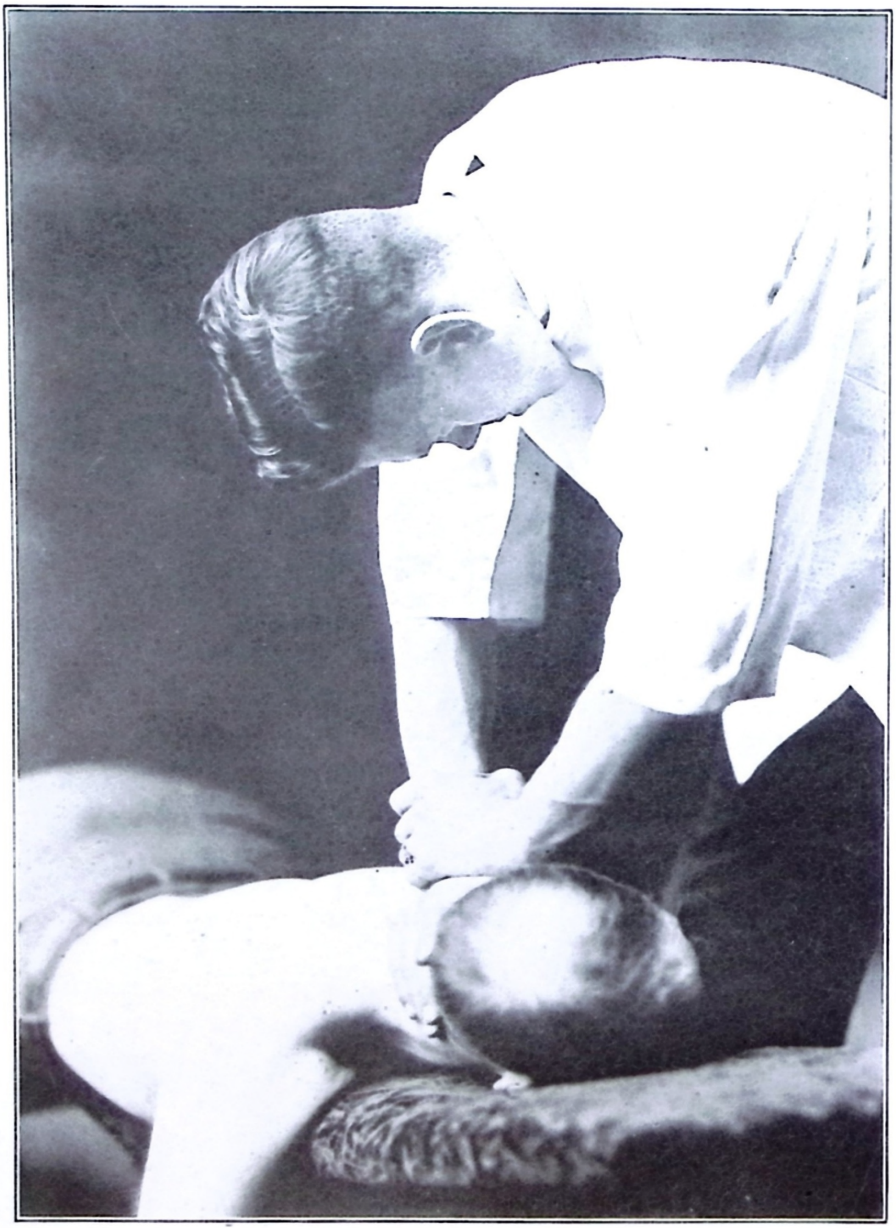

Correct Position for Posterior Left Subluxation of Seventh Cervical Vertebra

located with the second finger of that hand. The adjuster should stand a little to the superior because of the slope of the back in this region. The second finger of the right hand should be exchanged for the pointer finger of the left hand, care being taken to see that the tip of the pointer finger is on the left and posterior border of the spinous process. The skin should be drawn tense from the inferior toward the superior because in this region the slope of the back is downward from the second dorsal to the middle cervical group. If any slipping takes place it will be toward the superior, and the tensing of the skin inferior to the point of contact will help to prevent this taking place.

The right hand is now placed as the nail hand, bringing the contact surface of the pisiform bone into direct contact with the left and posterior border of the spinous process. The adjuster in this position should not attempt to arch the hand as in the middle dorsal region, but should permit the fingers to rest easily around the back of the neck and the occiput. The fingers should be pointed somewhat toward the superior, and the thumb of the nail hand should point straight to the superior lying directly behind the pinna of the ear, but not in contact with the mastoid process of the temporal bone. The palm of the hand should be held fairly flat, but not in contact with the surface of the neck. The pointer finger of the left hand is withdrawn and the left hand is then placed as the hammer hand, care being taken to see that the pisiform bone rests snugly in the depression formed by the arching of the nail hand. The shoulders, in this position, lie somewhat obliquely across the spine, but nearer the parallel. Because the lower cervical vertebrae and upper dorsal vertebrae have their spinous processes to the right of the median line, it is not necessary for the adjuster to lean away from his patients at all. This rotating of the lower cervical and upper dorsal vertebrae is the result of the patient's face being turned toward the side of the laterality. Thus the adjuster should lean in such a manner that the episternal notch will be in line with a perpen-

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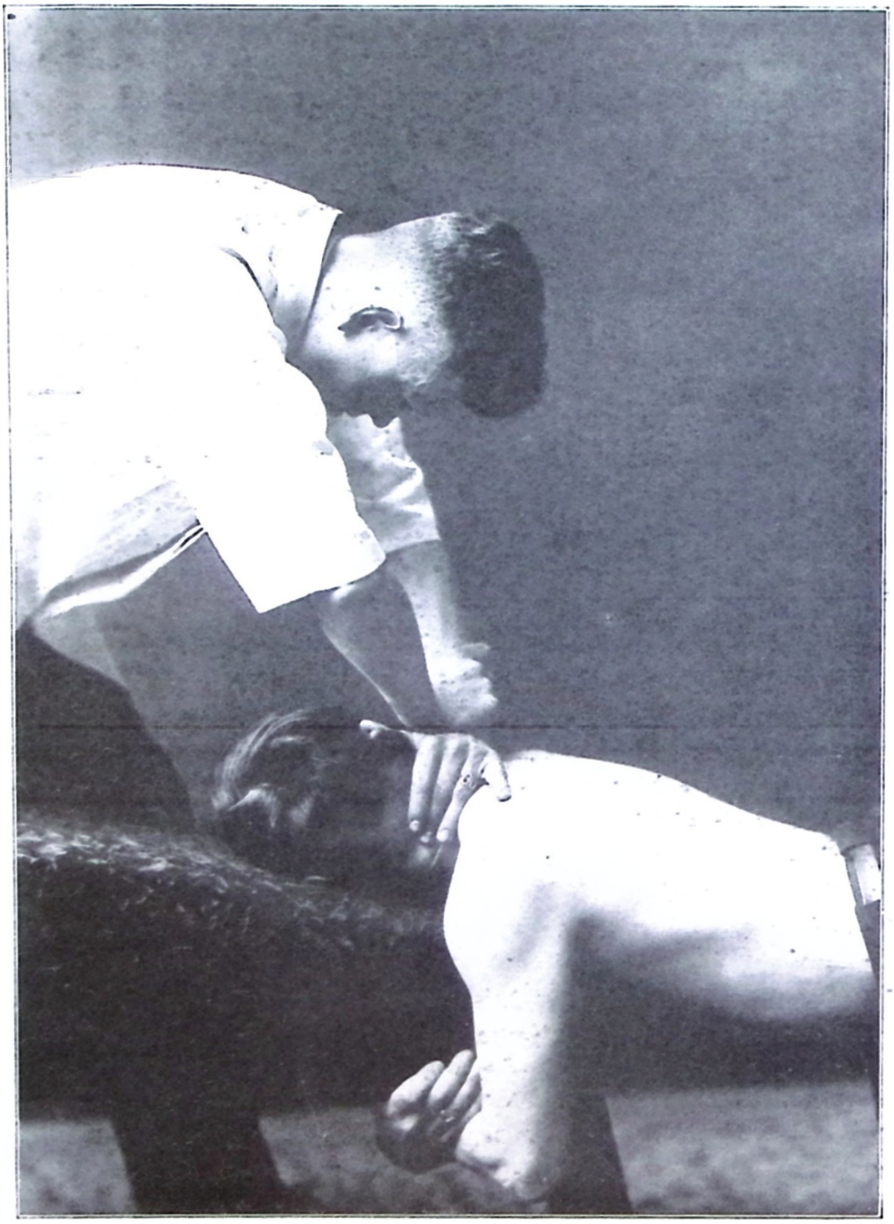

Correct Position for Posterior Superior Subluxation of Seventh Cervical Vertebra With Adjuster Standing on the Right Side

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Correct Position for Posterior Superior Subluxation of Seventh Cervical Vertebra With Adjuster Standing on the Left Side

dicular drawn to the surface of the back at the point of contact. After seeing that the arms and shoulders are thoroughly relaxed, the adjustment is delivered in a line perpendicular to the surface of the back at the point of contact.

Posterior Superior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but the patient's face must be turned toward the side on which the adjuster is standing. If the adjuster is standing on the right side, the left hand is used as the palpating hand and the posterior superior border of the spinous process is located by the second finger of that hand. The adjuster should now step well to the superior and facing to the inferior, stand with both legs resting against the side of the adjusting table. The pointer finger of the left hand is then exchanged for the pointer finger of the right hand, seeing that the skin is drawn from the inferior toward the superior.

The left hand is now placed as the nail hand, care being taken to see that the contact surface of the pisiform bone is brought in direct contact with the posterior superior border of the spinous process. The fingers of the nail hand should be permitted to rest easily around the back of the patient's neck, with the thumb extending straight toward the superior behind the pinna of the ear in contact with the mastoid process of the temporal bone. The palm of the nail hand should be held fairly flat, but not in contact with the surface of the neck. The pointer finger of the right hand is now withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be so held that they extend straight across the spine, forming a right angle with the line of the spine. The adjuster should lean in such a manner that the episternal notch is superior and somewhat to the left of a perpendicular dropped to the surface of the back at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjust-

ment should be delivered, directing the force downward toward the right and inferior.

If the adjuster is standing on the left side of the patient he should see that the patient's face is turned toward the left. The right hand is then used as the palpating hand and the posterior superior border of the spinous process is located with the second finger of that hand. The adjuster should now step well to the superior, facing the inferior, and with both legs resting against the side of the adjusting table. The pointer finger of the right hand is now exchanged for the pointer finger of the left hand, care being taken to see that the skin is drawn from the inferior toward the superior. This is done because of the tendency of the adjuster to slip toward the superior when the adjustment is delivered, although this error is not so apt to occur in subluxations in this region which show superiority.

The right hand is now placed as the nail hand, with the contact surface of the pisiform bone in contact with the posterior superior border of the spinous process. The fingers of the nail hand should be permitted to rest easily around the neck of the patient, with the thumb pointing straight to the superior and behind the pinna of the ear, although not in contact with the mastoid process of the temporal bone. The palm of the nail hand is held fairly flat, although not in contact with the surface of the neck. The pointer finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms are held so that they cross the spine at an angle of approximately 90°, and the arms should be equally bent. The adjuster should lean in such a manner that the episternal notch is superior and somewhat to the right of a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force downward and toward the left and inferior.

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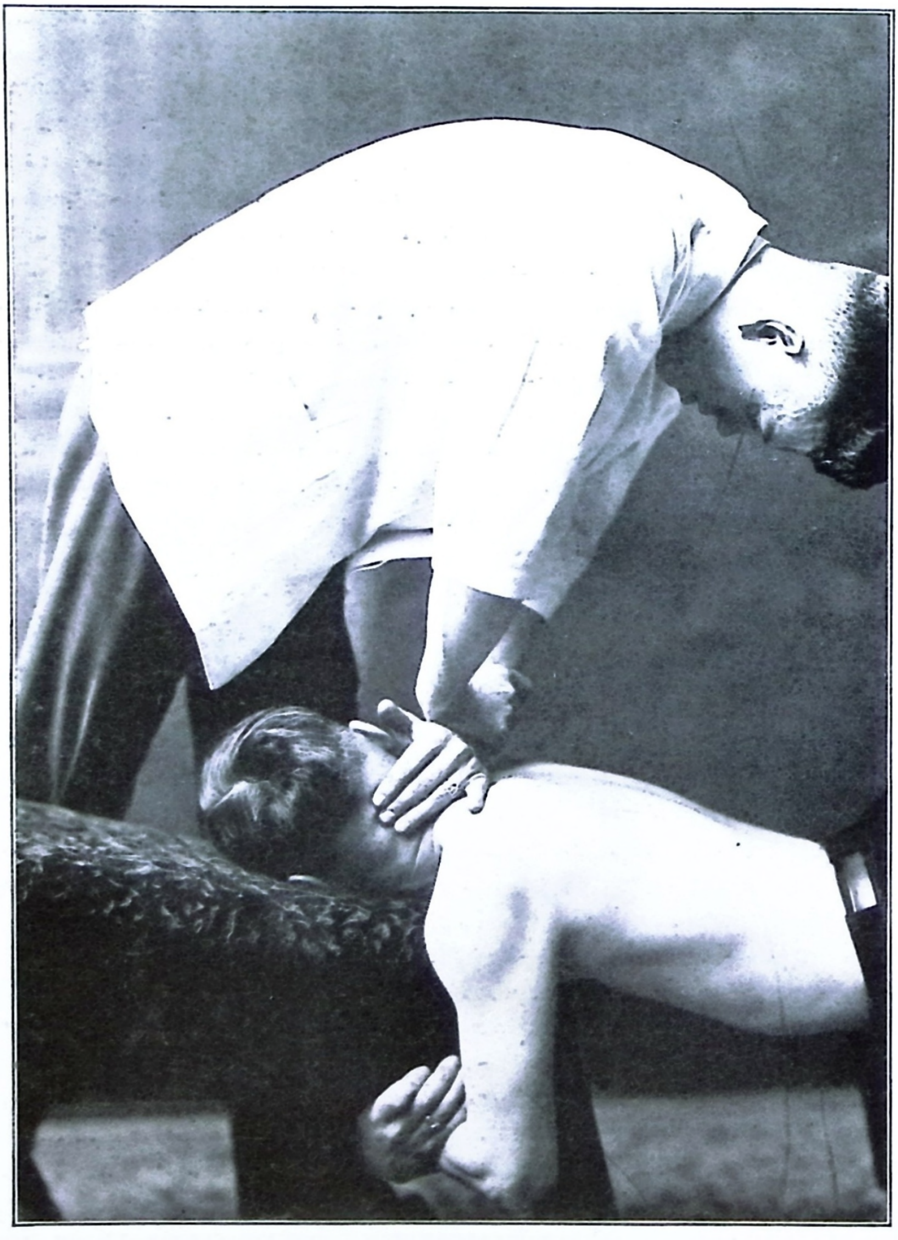

Correct Position for Posterior Inferior Subluxation of Seventh Cervical Vertebra with Adjuster Standing on the Right Side

Posterior Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient; but he must be careful to see that the patient's face is turned toward the side on which he is standing. If the adjuster is standing on the right side, the patient's face is turned toward the right and the palpation is made with the left hand. The posterior inferior border of the spinous process is located by the second finger of the palpating hand. The adjuster should now step to the superior, facing the inferior, and stand with both legs resting against the adjusting table. The pointer finger of the left hand is now exchanged for the pointer finger of the right hand, care being taken to see that the skin is drawn from the inferior toward the superior across the point of contact. This for the reason that in any inferior subluxation of this group the tendency is for the adjuster to slip toward the cervical region when the adjustment is delivered. When the skin is made tense in this manner it assists the adjuster in maintaining the proper contact and delivering the adjustment more effectively.

The left hand is now placed as the nail hand, bringing the contact surface of the pisiform bone in contact with the posterior inferior border of the spinous process. The fingers of the nail hand should rest easily around the back of the patient's neck, with the thumb extending toward the superior behind the pinna of the ear, although it should not be allowed to rest on the mastoid process of the temporal bone. The palm of the hand is held more erect than in either the posterior or P. S. subluxation in this group. The pointer finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The arms and shoulders are held in such a manner that they form a right angle with the line of the spine, and with the arms equally bent. The adjuster should lean somewhat across his patient in order to avoid giving the adjustment from the right. This is because the spinous processes of the

lower cervical and upper dorsal vertebrae are rotated toward the left when the patient's face is turned toward the right. The adjuster should, however, see that the episternal notch is inferior to the perpendicular drawn to the surface of the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force downward somewhat toward the right and superior.

If the adjuster is standing on the left side of the patient, he should see that the face of the patient is turned toward the left. The right hand is used as the palpating hand and the posterior inferior border of the spinous process is located with the second finger of that hand. The adjuster should now step to the superior, facing the inferior, and with both legs resting against the side of the adjusting table. The pointer finger of the right hand is now exchanged for the pointer finger of the left hand, care being taken to see that the skin is drawn tightly from the inferior toward the superior. This is for the reason that the back slopes sharply downward from the second dorsal to the middle cervical group and this stretching of the skin assists the adjuster in maintaining the proper contact when the adjustment is delivered.

The right hand is now placed as the nail hand, seeing that the contact surface of the pisiform bone is brought in direct contact with the posterior inferior border of the spinous process. The fingers of the nail hand should be allowed to rest easily around the neck of the patient, with the thumb pointing directly toward the superior behind the pinna of the ear, but not in contact with the mastoid process of the temporal bone. The palm of the hand is held more erect in this position than in either the posterior or the PS subluxations. The pointer finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held in such a manner that they form a right angle

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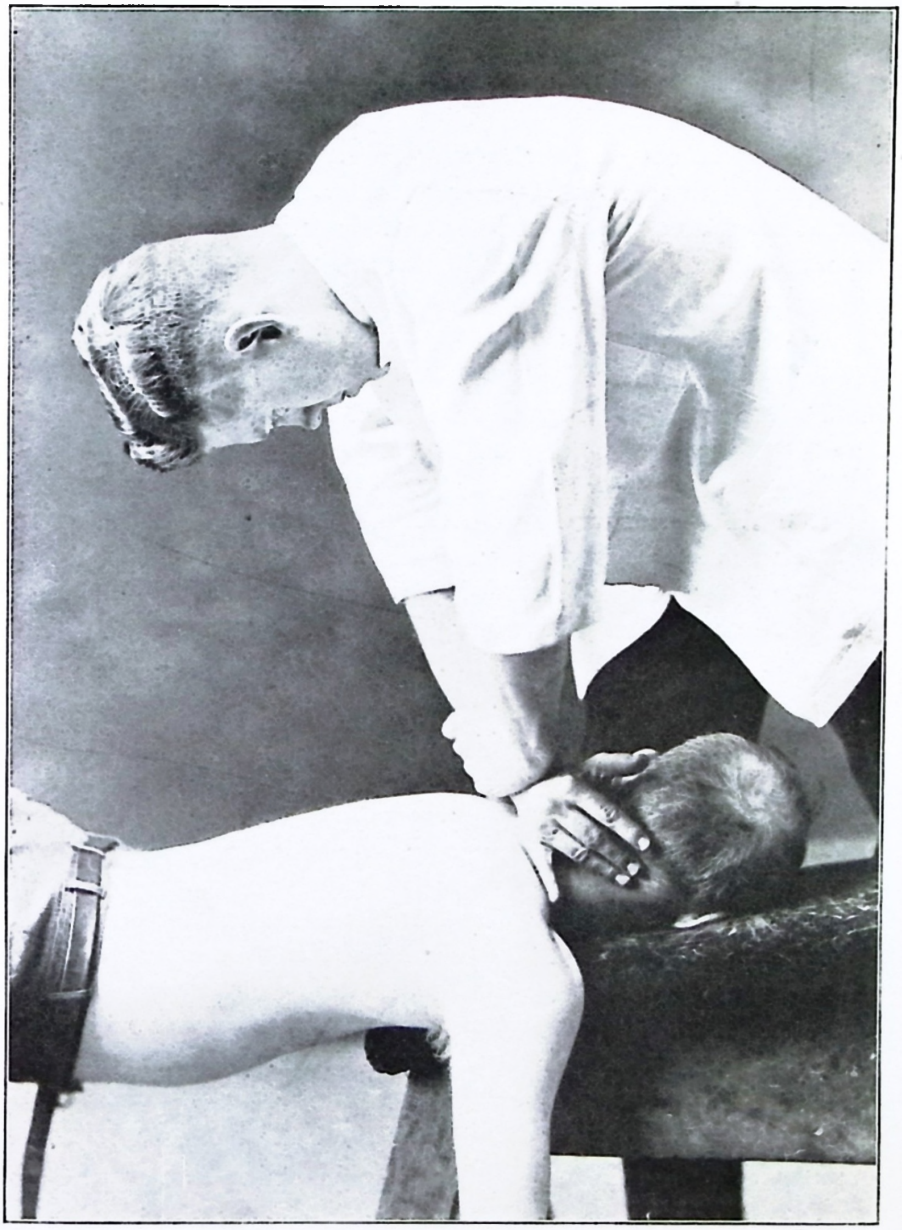

Correct Position for Posterior Inferior Subluxation of Seventh Cervical Vertebra With Adjuster Standing on the Left Side

to the line of the spine and the arms should be equally bent. The adjuster leans in such a manner that the episternal notch is somewhat to the right of a perpendicular drawn to the surface of the back at the point of contact. This for the reason that the lower cervical and upper dorsal vertebrae have their spinous processes rotated toward the right. Care should be taken to see that the episternal notch is inferior to the perpendicular drawn to the surface of the back at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered, directing the force downward and somewhat toward the left and superior.

Posterior Right Superior Subluxation. In this subluxation the adjuster should stand on the right side of the patient and he should see that the patient's face is turned toward the right. Palpation is made with the left hand and the posterior right and superior border of the spinous process is located with the second finger of that hand. The adjuster should now step to the superior, facing his patient. The pointer finger of the right hand is exchanged for the pointer finger of the left hand, care being taken to see that the skin is drawn from the inferior toward the superior and across the spinous processes toward the right. This is in order that the adjuster may have the advantage of a tense skin under this contact point and may thus be assisted in maintaining his contact when the adjustment is delivered.

The left hand is now placed as the nail hand, bringing the contact surface of the pisiform bone in direct contact with the posterior right and superior border of the spinous process. The fingers of the nail hand should be permitted to rest easily around the back of the patient's neck, with the thumb pointing directly to the superior behind the pinna of the ear, but not in contact with the mastoid process of the temporal bone. The palm of the nail hand is held fairly flat, but should not rest upon the surface of the neck. The pointer finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform

bone fits snugly into the groove formed by the arching of the nail hand. The shoulder and arms, in this position, extend obliquely across the spine, and the arms are equally bent. The adjuster should lean in such a manner that the episternal notch will be to the right and superior to the perpendicular drawn to the surface of the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered directing the force downward toward the left and inferior.

Posterior Right Inferior Subluxation. In this subluxation the adjuster should stand on the right side of the patient and should be careful to note that the face of the patient is turned toward the right. The left hand is used as the palpating hand and the posterior right and inferior border of the spinous process is located with the second finger of that hand. The adjuster should now stand opposite the subluxation as the slope of the neck at the point of contact gives a natural inferiority to the adjustment when it is delivered straight toward the floor. The pointer finger of the left hand is now exchanged for the pointer finger of the right hand, care being taken to see that the skin is made tense by being drawn from the inferior toward the superior and across the spinous process toward the right. The left hand is now placed as the nail hand, bringing the contact surface of the pisiform bone in contact with the posterior right and inferior border of the spinous process. The fingers of the nail hand should be permitted to rest easily around the back of the patient's neck, with the thumb pointing straight to the superior behind the pinna of the ear, but not resting upon the mastoid process of the temporal bone. The hand is held more erect than in either the PR or the PRS subluxations in this group.

The pointer finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms are held parallel to the spine, with the left

Cut 91

Correct Position for Posterior Right Superior Subluxation of Seventh Cervical Vertebra

Cut 92

Correct Position for Posterior Right Inferior Subluxation of Seventh Cervical Vertebra

shoulder somewhat lower than the right and with the arms equally bent. The adjuster should lean in such a manner that the episternal notch is to the right and inferior of the perpendicular drawn to the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, directing the force downward and toward the superior.

Posterior Left Superior Subluxation. In this subluxation the adjuster stands on the left side of the patient and should see that the patient's head is turned toward the left. Palpation is made with the right hand and the posterior left and inferior border of the spinous process is located with the second finger of that hand. The adjuster now should stand well to the superior, facing his patient. The pointer finger of the right hand is exchanged for the pointer finger of the left hand, care being taken to see that the skin is stretched tightly from the inferior toward the superior and across the spinous process toward the left. This is done in order that the adjuster may have a more firm hold on his contact point when the adjustment is delivered. The right hand is placed as the nail hand, bringing the contact surface of the pisiform bone in direct contact with the posterior left and superior border of the spinous process. The fingers of the nail hand should be permitted to rest easily around the back of the patient's neck, with the thumb pointing directly toward the superior behind the pinna of the ear. The thumb, however, should not rest upon the mastoid process of the temporal bone. The palm of the nail hand is held firmly flat, although not in contact with the surface of the neck.

The pointer finger of the left hand is now carefully withdrawn, and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The arms and shoulders are held obliquely across the spine and the arms are equally bent. The adjuster should lean in such a manner that the episternal notch is to the left and superior of a per-

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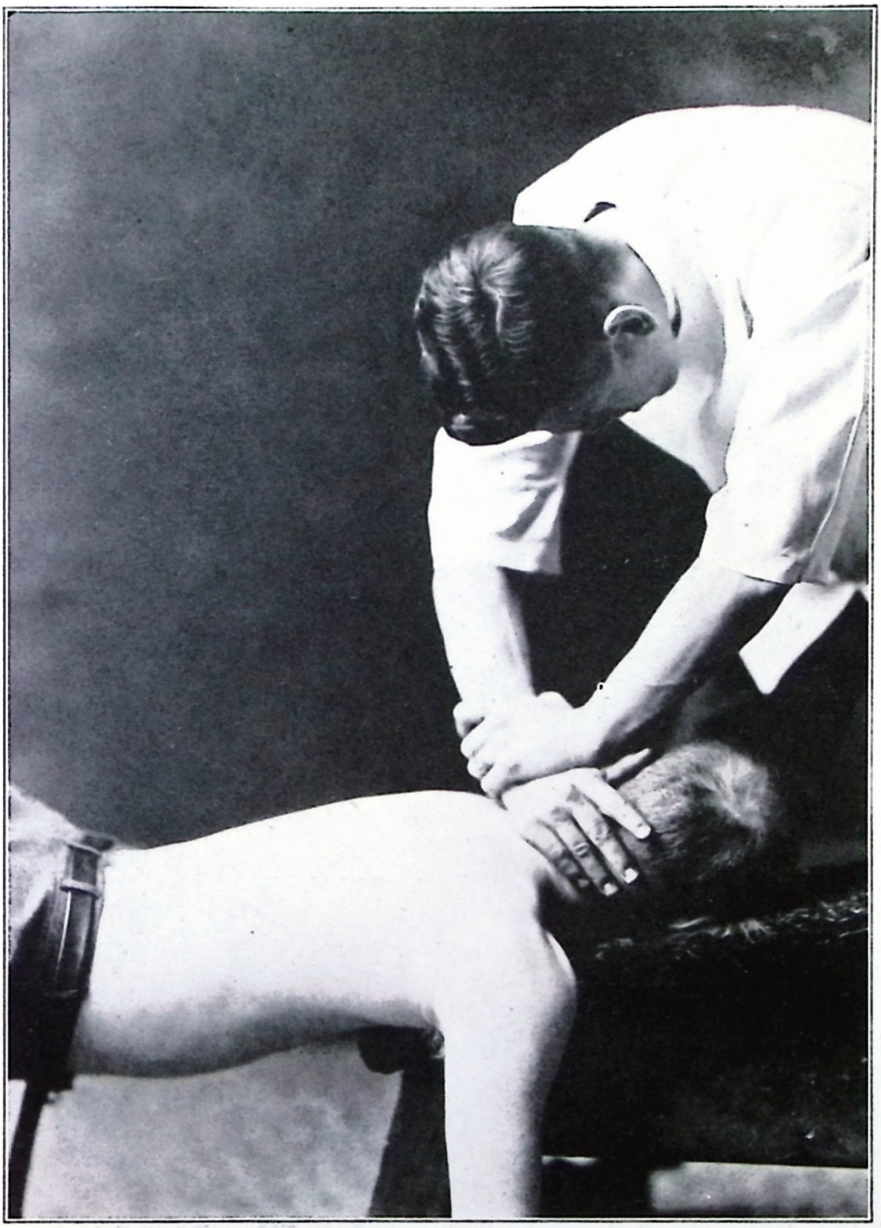
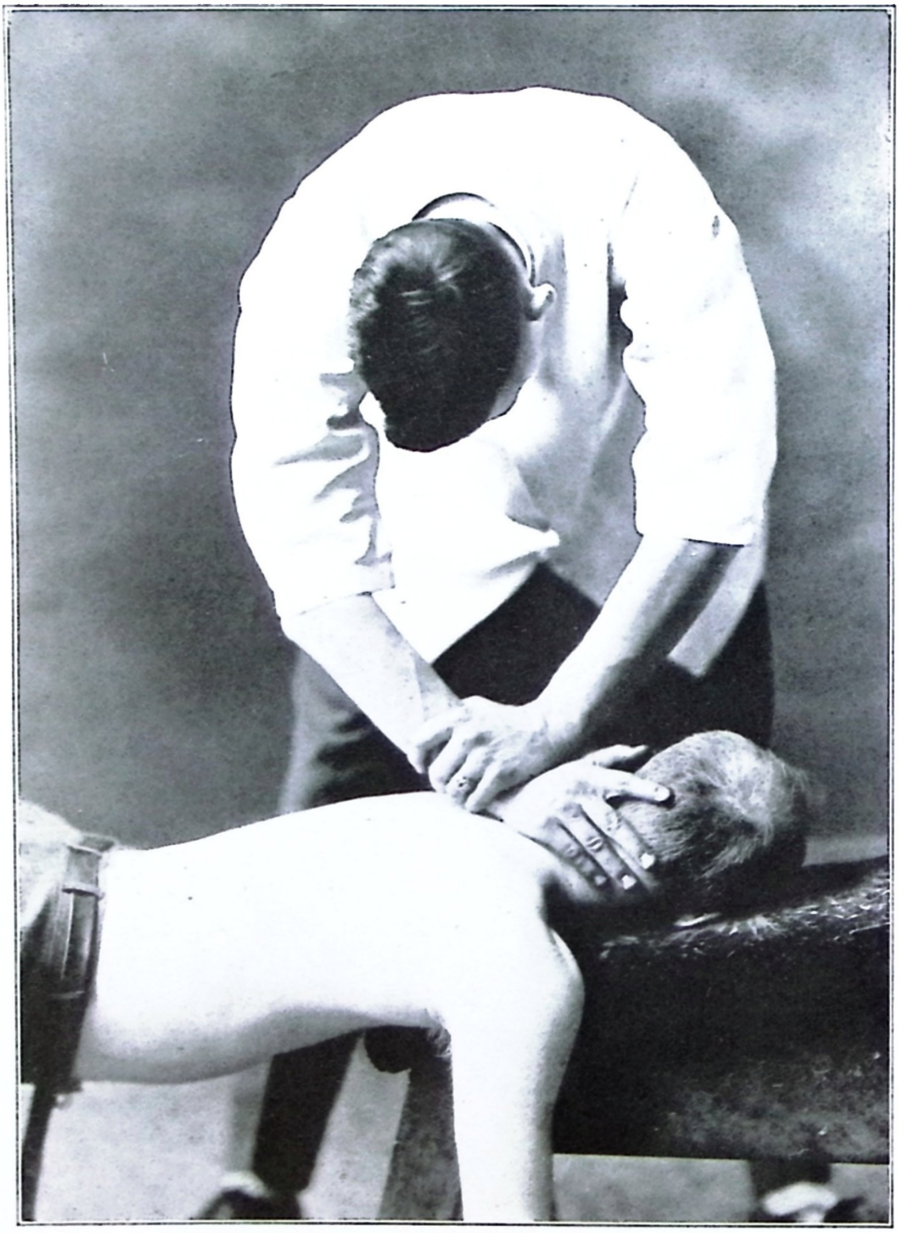


Correct Position for Posterior Left Superior Subluxation of Seventh Cervical Vertebra

Cut 94



Correct Position for Posterior Left Inferior Subluxation of Seventh Cervical Vertebra

pendicular line drawn to the surface of the back at the point of contact. After seeing that the arms and shoulders are properly relaxed the adjustment is delivered, directing the force downward and toward the inferior.

Posterior Left Inferior Subluxation. In this subluxation the adjuster stands on the left side of the patient and should see that the patient's face is turned toward the left. Palpation is made with the right hand and the posterior left and inferior border of the spinous process is located with the pointer finger of that hand. The adjuster should stand opposite the point of contact, as the natural slope of the neck in this region gives a certain degree of inferiority. The pointer finger of the right hand is now exchanged for the pointer finger of the left hand, care being taken to see that the skin is drawn tightly from the inferior toward the superior and across the spinous process toward the left. This is important because, on the inferior subluxations especially, the tendency is for the adjuster to slip toward the cervical group, and the stretching of the skin very materially aids him in maintaining the proper contact when the adjustment is delivered.

The right hand is now placed as the nail hand, bringing the contact surface of the pisiform bone in direct contact with the posterior left and inferior border of the spinous process. The fingers of the nail hand should be permitted to rest easily around the back of the patient's neck, with the thumb pointing straight to the superior behind the pinna of the ear. The thumb, however, should not be permitted to rest upon the mastoid process of the temporal bone. The palm of the hand is held more erect in this position than in either the PL or PLS subluxations. The pointer finger on the left hand should be carefully withdrawn and the left hand placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The arms and shoulders should extend parallel to the spine, with the right shoulder somewhat lower than the left, and with arms equally bent. The adjuster should lean in such a man-

ner that the episternal notch is left and inferior to the perpendicular drawn to the surface of the neck at the point of contact. After seeing that the proper relaxation exists in the arms and shoulders, the adjustment should be delivered, directing the force downward and toward the right and superior.

General Considerations Involving the Above Subluxations. It will be noted that in the above subluxations care has been taken to instruct the adjuster in every case to pull the skin from the inferior toward the superior. This is true in this region, no matter what the subluxation is, and it is given in order that the adjuster may have the natural advantage of a tense skin helping to prevent him from slipping toward the superior. Because of the peculiar slope of the back in this region of the spine, there is always a tendency on the part of the adjuster to slip toward the middle cervical group, but if the proper tension is put on the skin below the point of contact it will eliminate this possibility to a large extent.

It will also be noted that in the above subluxations the adjuster was instructed not to hold the fingers of the nail hand stiffly, but to permit them to rest easily around the back of the patient's neck. This is for the reason that the shape of the neck does not give rise to the necessity for the arching of the hand as in the dorsal and lumbar regions. On the reverse, if the hand is held stiffly, the fingers cannot maintain as firm an anchorage as they might obtain by allowing them to settle easily around the neck.

The face of the patient in this group is always turned toward the adjuster, because if this were not true, there would not be offered as firm an anchorage for the fingers of the nail hand. With the face turned toward the adjuster, the fingers can rest around the back of the patient's neck and thus a firm foundation can be established. If, however, the patient's face is turned from the adjuster, the mandible would offer itself as an obstruction to the placing of the fingers of the nail hand. The first, and perhaps the second, fingers would be forced to rest upon the mandible of the patient, and this contact could

not possibly afford as effective a brace as if the fingers were permitted to rest around the back of the patient's neck.

The question may arise as to why the adjuster should stand on the superior in a posterior superior subluxation. It might be suggested that it would be possible for the adjuster to stand directly opposite the point of contact, leaning to the superior or the inferior, as might be indicated by the subluxation. It can readily be seen, however, that if this method were used, the weight of the body could not be as successfully utilized in the delivery of the adjustment. In other words, by this method the adjuster is forced to assume a position which throws him more or less out of balance and he cannot give an adjustment as effectively as would be possible by standing to the superior. It must be remembered that the vertebrae in this group require as much force as vertebrae in any other part of the spine, and, in many cases, greater force is required here than in other areas. Therefore, it is essential that the adjuster assume such a position as will give him the greatest possible ease and one in which he can deliver the greatest possible amount of force. As this is true of the posterior P. S. and P. I. subluxations, it is equally true of the three lettered subluxations. Here the adjuster should stand in the line drawn through the spinous process in its abnormal position and its normal position. By so doing, he is enabled to place the entire weight of his body behind each adjustment and thus deliver a greater amount of force than he could possibly get were he to lean to either side.

RECOIL ADJUSTMENT FROM AXIS TO FIFTH CERVICAL VERTEBRA, INCLUSIVE.

Posterior Subluxation. In this subluxation the patient's face is turned away from the side on which the adjuster is standing. The adjustment may be delivered from either side, but the adjuster should see that the face is properly turned before he begins making his palpation. If the adjuster is standing upon the right side, the patient's face is turned toward

Cut 95

Correct Position for Posterior Subluxation of Axis With Adjuster Standing on the Right Side

the left and the adjuster stands with his left foot forward, his back turned to the patient and both legs resting against the patient's body. Palpation is then made with the right hand, held palm up and with the little finger leading. The left hand can be rested upon the head of the patient in order to hold it in a constant position.

Palpation is made and the center of the bifurcation is located by the second finger of that hand. The first and third fingers are now removed and the nail hand is so turned that the palm faces downward and that the second finger points directly toward the superior. By turning the pointer hand in this manner, the trapezius muscle on the left side is crowded somewhat toward the left and leaves a more perfect contact for the nail hand. The nail hand is now placed, using nail point two and exercising every care to see that it finds its contact upon the posterior tips of the spinous process. The nail hand should be held in such a manner that the metacarpal bone of the small finger forms a right angle with the line of the spine and so that the fingers find a ready anchorage upon the surface of the neck. The pointer finger of the right hand is now withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders should be allowed to assume an easy, natural position, but the arms must be equally bent. The elbows of both the nail hand and the hammer hand should be held well away from the body of the adjuster, and particularly is this important in the nail hand, because it is in this way that the wrist is made more rigid and the tendency of the nail hand to drop flat against the neck of the patient when the adjustment is delivered is thereby eliminated. The adjuster should lean in such a manner that the episternal notch is perpendicular to the surface of the neck at the point of contact. After seeing that the arms and shoulders are thoroughly relaxed, the adjustment is delivered, taking into consideration the turning of the patient's head as the patient lies upon the adjusting table.

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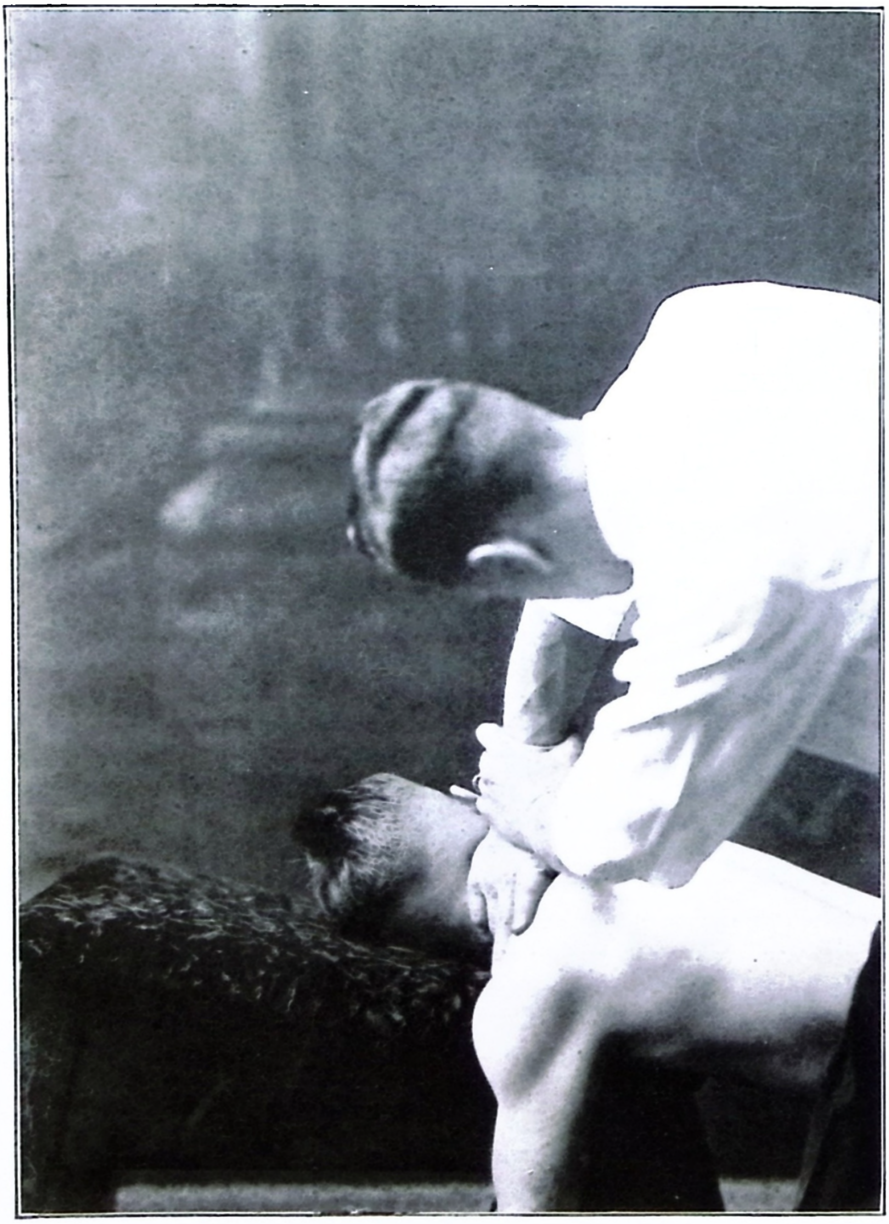

Correct Position for Posterior Subluxation of Axis With Adjuster Standing on the Left Side

If the adjuster is standing on the left side of the patient for this subluxation, the patient's face should be turned toward the right. The adjuster should then assume a standing position opposite the trunk of the patient, with his right foot forward, his back to the patient and both legs resting against the patient's body. With the right hand resting on the patient's head, in order to hold its position more constant, the palpation is made with the left hand, palm held upward and the little finger leading. The bifurcation of the spinous process is then located by the second finger of the palpating hand, and the palpating hand is then turned in such a manner that the palm points downward toward the surface of the back and the second finger extends straight toward the superior. This procedure crowds the right trapezius muscles further toward the right and permits a more accurate point of contact for the nail point.

The right hand is then placed as the nail hand, care being taken to see that it rests exactly on the posterior border of the spinous process tip. The metacarpal bone of the small finger should extend at right angles to the line of the spine, and the fingers of the nail hand should be permitted to rest easily upon the surface of the neck or shoulders. Thus they offer themselves as a ready anchorage and produce a firmer contact than otherwise could be obtained. The second finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, comfortable position, but the arms must be equally bent. The adjuster leans in such a manner that the episternal notch is in a line perpendicular to the surface of the neck at the point of contact. This means that the adjuster must lean out from his patient in order to avoid giving an adjustment which possesses laterality.

After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consid-

eration the turning of the patient's head as he lies upon the adjusting table.

In a posterior subluxation in this region the palm of the nail hand should not be held against the surface of the neck nor should it be held so that it forms an angle of 90°. On the reverse, where neither superiority nor inferiority is indicated, the palm of the nail hand should form an angle of approximately 45° with the surface of the neck.

Posterior Right Subluxation. This subluxation may be adjusted with the adjuster standing on either side of the patient. If he is standing on the right side, the patient's head is turned to the right, and in making the palpation the adjuster should stand well to the superior, so that the palpating hand does not become cramped. The right hand should rest easily upon the head of the patient and the left hand is used as the palpating hand locating the right posterior border of the right prong of the vertebra in question. This point is located with the second finger. The adjuster now steps well to the inferior, facing his patient with the right foot forward and with both legs resting against the body of the patient. The pointer finger of the nail hand is turned so that the palm points downward and the second finger extends straight toward the superior. By doing this, the right trapezius muscle is crowded further toward the right and nail point two of the right hand thus finds an easier contact upon the spinous process. The right hand is placed as the nail hand, using nail point two as the contact point and placing it upon the posterior right border of the right prong in question.

Care should be taken to see that the metacarpal bone of the small finger extends at right angles to the line of the spine and that the fingers of the nail hand rest easily upon the surface of the patient's neck and shoulder. The pointer finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that it rests firmly in the groove formed by the arching of the nail hand. The palm of the hand should form an angle of approxi-

Cut 97

Correct Position for Posterior Right Subluxation of Axis With Adjuster Standing on the Right Side

Cut 98

Correct Position for Posterior Right Subluxation of Axis With Adjuster Standing on the Left Side

mately 45° with the surface of the neck at the point of contact. The shoulders should be permitted to assume an easy, comfortable position, but the arms should be equally bent, and care should be taken to see that they are held well away from the adjuster's body. Particularly is this important of the right arm, as it is only in this manner that the wrist of the nail hand can be held rigid and thus avoid the possibility of the palm of the hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is to the right of a perpendicular dropped to the surface of the neck at the point of contact, and this can only be accomplished by leaning across the patient.

After seeing that the arms and shoulders are thoroughly relaxed, the adjustment is delivered, taking into consideration the turn which the head has made while resting on the adjusting table.

If the adjuster is standing on the left side of the patient he should see that the patient's face is turned toward the right. The adjuster should assume a standing position, with his right foot forward, his back to the patient and both legs resting against the patient's body. This standing position should be opposite the trunk of the patient's body. With the right hand resting on the patient's head, the palpation is made with the left hand, palm up and with the little finger leading. With the second finger of the palpating hand, the posterior right border of the right prong of the vertebra is located. The nail hand is now turned in such a manner that the palm points downward toward the back and the second finger is directed toward the superior. By this method the trapezius muscle on the right side is crowded toward the right and a more advantageous contact is thus procured for the placing of nail point two of the right hand.

The right hand is now placed as the nail hand; using nail point two and seeing that the metacarpal bone of the small finger forms a right angle to the line of the spine. The fingers

Cut 99

Correct Position for Posterior Left Subluxation of Axis With Adjuster Standing on the Right Side

of the nail hand should rest easily upon the neck and shoulder of the patient in order to afford a firm anchorage for that hand. The pointer finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders of the adjuster should be permitted to assume an easy, comfortable position, but the arms must be equally bent. It is also essential that the elbows be held well away from the body of the adjuster, and particularly is this important of the nail hand, because it is through this method that the wrist is made more rigid, so that the palm of the hand cannot collapse against the surface of the patient's neck when the adjustment is delivered. The palm of the nail hand should here form an angle of approximately 45° with the surface of the patient's neck at the point of contact. The adjuster should lean in such a manner that his episternal notch is to the right of a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the proper relaxation exists in the arms and shoulders, the adjustment is delivered, taking into consideration the relative positions of the vertebrae as caused by the turning of the patient's face.

Posterior Left Subluxation. In this subluxation the adjuster may stand on either side of the patient and neither side is more advantageous than the other. If he is standing on the right side of the patient, he should see that the patient's face is turned toward the left. The adjuster should then stand opposite the trunk of the patient with the left foot forward, his back to the patient and both legs resting against the patient's body. The left hand is then placed on the head of the patient and the right hand becomes the palpating hand. The posterior and left border of the left prong of the spinous process is then located with the second finger of the right hand. The right hand is then turned in such a manner that the palm of the hand faces downward and the second finger extends straight toward the superior. In this manner the

left trapezius muscle is crowded toward the left and a more advantageous point of contact is thus exposed for the placing of the nail hand.

The nail hand is now placed, using nail point two and seeing that the metacarpal bone of the small finger extends at right angles with the line of the spine. Care should be taken also to see that the fingers of the nail hand rest easily upon the neck and shoulders in order to more advantageously hold the nail hand in a firm contact. The palm of the nail hand should be held in such a manner that it forms an angle of 45° with the surface of the neck at the point of contact. The pointer finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand.

The shoulders should be permitted to assume an easy, comfortable position but the arms must be equally bent. Care should be taken to see that the elbows are held well away from the body of the adjuster and particularly is this important in the case of the left arm. If the left elbow is held well away from the body of the adjuster it produces a rigidity of the left wrist and does away with the possibility of the nail hand collapsing to the surface of the neck when the adjustment is delivered.

The adjuster should lean in such a manner that the episternal notch is to the left of a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are thoroughly relaxed, the adjustment is delivered, taking into consideration the altered position of the vertebrae as produced by the turning of the patient's head.

If the adjustment is delivered from the left side, the adjuster should see that the patient's face is turned toward the left. In making the palpation he should assume a standing position well superior to the vertebra in question. With the left hand resting upon the head of the patient, palpation is made with the right hand and the posterior left border of the

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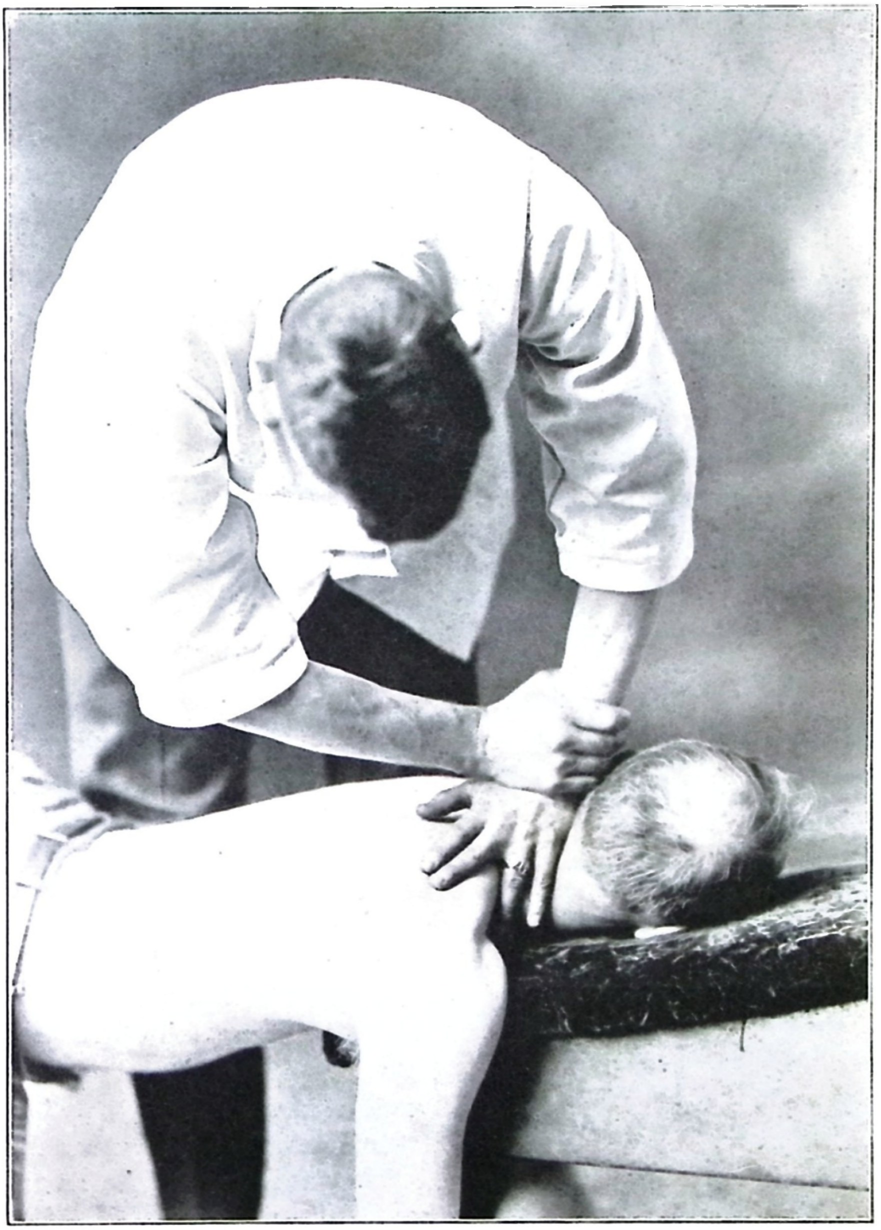

Correct Position for Posterior Left Subluxation of Axis with Adjuster Standing on the Left Side

left prong of the vertebra in question is located by the second finger of that hand. The adjuster should now step well to the inferior, facing his patient and with both legs resting against the patient's body. The right hand is turned so that the palm faces downward and the second finger extends straight toward the superior. In this manner the left trapezius muscle is crowded toward the left and a more advantageous contact is exposed upon which to place the nail hand. The left hand is now placed as the nail hand, bringing nail point two in direct contact with the left prong of the vertebra. Care should be taken to see that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers should also be permitted to assume an easy contact with the surface of the neck and shoulders. The palm of the nail hand should be held in such a manner that it forms an angle of 45° with the surface of the neck at the point of contact.

The pointer finger of the right hand should now be carefully withdrawn and the right hand placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders should be allowed to assume an easy, comfortable position, but the arms must be equally bent. Care should be taken to see that the arms are held well away from the adjuster's body and particularly is this true of the left arm. If the left arm is held away from the body of the adjuster, it gives to the wrist of the nail hand a rigidity which it could not otherwise possess. When this is done, there is no danger of the nail hand collapsing to the surface of the neck when the adjustment is delivered.

The adjuster should lean in such a manner that the episternal notch is left of a perpendicular drawn to the surface of the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the altered position of the cervical vertebrae by the turning of the patient's head.

Cut 101

Correct Position for Posterior Superior Subluxation of Axis With Adjuster Standing on the Right Side

Posterior Superior Subluxation. In this subluxation the adjuster may stand on either side of the patient but the patient's head must be turned opposite to the side on which the adjuster is standing.

If the adjuster is standing on the right side of the patient, he should see that the patient's head is turned toward the left. The adjuster now assumes the standing position inferior to the vertebra in question, with his back toward the patient, his left foot forward and both legs resting against the patient's body. After placing the left hand upon the patient's head, palpation is made with the right hand held palm up and with the little finger leading. The upper border of the bifurcation is located by the second finger of the right hand and all fingers are then removed with the exception of the second finger. The nail hand is then turned in such a manner that the palm faces downward and the pointer finger extends straight toward the superior. By this method the left trapezius muscle is crowded somewhat to the left and a more advantageous point of contact is thus offered for the placing of the nail hand.

The left hand is now placed as the nail hand using nail point two. Care should be taken to see that the metacarpal bone of the small finger extends at right angles to the line of the spine. The fingers of the nail hand should also be allowed to find an easy contact on the surface of the patient's neck and shoulder. The palm of the nail hand should, in this position, form an angle of approximately 60° with the surface of the neck at the point of contact. The pointer finger of the right hand is now carefully removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders should be allowed to assume an easy, comfortable position but the arms should be equally bent. The adjuster should be careful to see that the elbows are held well away from his body and this is particularly important with the left arm. By doing this, a rigidity is pro-

duced in the wrist of the nail hand which will prevent the palm of the hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is superior to a perpendicular drawn to the surface of the neck at the point of contact. This means that the adjuster must lean well out from the patient and toward the superior in order to avoid adjusting the vertebra from the left. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered taking into consideration the altered position of the vertebra due to the turning of the patient's head.

If the adjuster is standing on the left side of the patient he should see that the patient's face is turned toward the right. He should then assume a standing position opposite the trunk of his patient with the right foot forward, his back to the patient and with both legs resting against the patient's body. After placing the right hand upon the patient's head, palpation is made with the left hand held palm up and with the little finger leading. In this manner the superior border of the bifurcation is located with the second finger of the left hand. The first and third fingers are now removed and the left hand turned in such a manner that the palm faces downward and the pointer finger extends straight toward the superior. By this method the right trapezius muscle is crowded toward the right and a more advantageous contact is thus offered for the placing of the nail hand.

Nail point two of the right hand is now placed in contact with the posterior superior border of the spinous process, care being taken to see that the metacarpal bone of the small finger extends at right angles to the line of the spine. The fingers of the nail hand should rest firmly upon the neck and shoulders of the patient. The palm of the right hand should form an angle of approximately 60° with the surface of the neck at the point of contact. The pointer finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly

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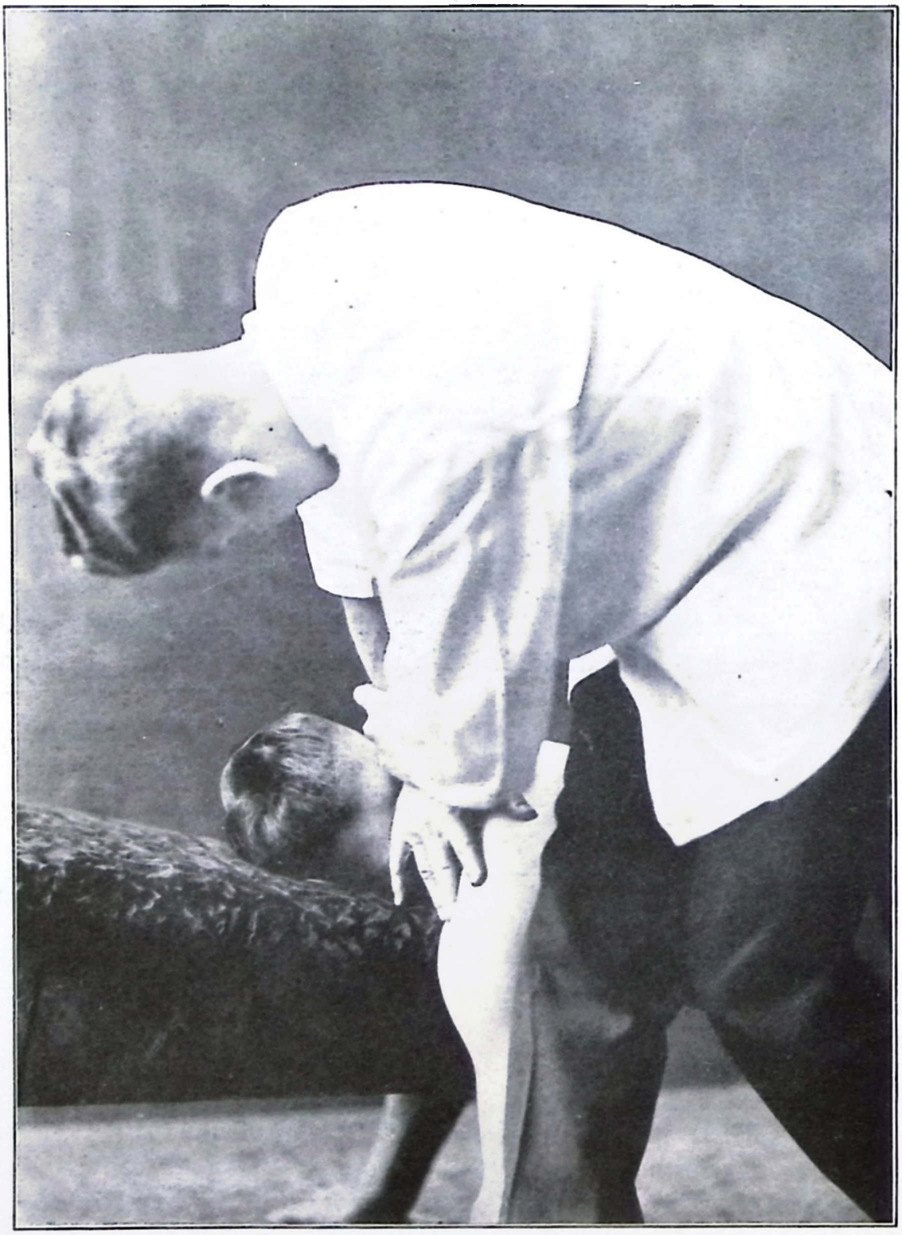

Correct Position for Posterior Superior Subluxation of Axis with Adjuster Standing on the Left Side

into the depression formed by the arching of the nail hand. The shoulders should be allowed to assume an easy, natural position but the arms should be equally bent. Special care should be given to holding the elbows away from the adjuster's body and particularly is this essential with the right elbow. If this is done, it will be found that a rigidity of the wrist of the nail hand is produced which eliminates the possibility of the palm of the nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is superior to the perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed the adjustment is delivered, taking into consideration the alteration of the position of the cervical vertebrae due to the turning of the patient's head.

Posterior Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient but he should see that the patient's face is away from the side on which he is standing. If the adjuster is standing on the right side of the patient, the patient's face is turned toward the left. The adjuster assumes the standing position opposite the trunk of the patient, his back to the patient, his left foot forward and both legs resting against the patient's body. The adjuster now places the left hand on the patient's head and the palpation is made with the right hand, held palm up and with the little finger leading. The inferior border of the bifurcation is located with the second finger of the right hand, all fingers being removed with the exception of the second finger. The nail hand is now turned in such a manner that the palm faces downward and the second finger points toward the superior. This method serves to crowd the left trapezius muscle toward the left and thus offers a more advantageous contact for the left hand.

The left hand is now placed as the nail hand, seeing that the metacarpal bone of the small finger lies at right angles to the line of the spine. The fingers of the nail hand should be

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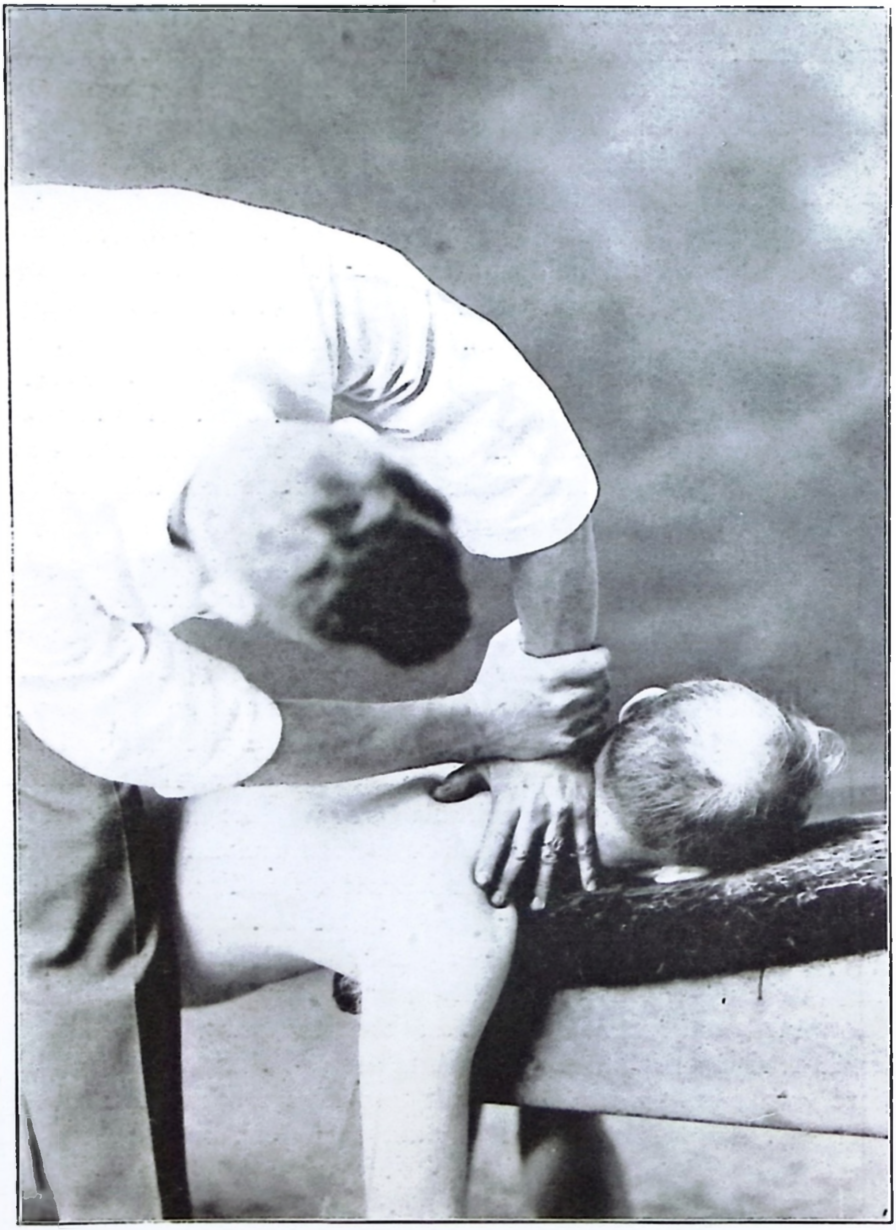

Correct Position for Posterior Inferior Subluxation of Axis With Adjuster Standing on the Right Side

permitted to rest firmly on the neck and shoulder of the patient. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact, being somewhat flatter than in either the posterior or the P. S. subluxation. The pointer finger of the right hand is now carefully removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders should be allowed to assume an easy, comfortable position but the arms must be equally bent. It is essential that the elbows be held well away from the adjuster's body and especially is this true of the left elbow. By following this procedure, the wrist of the left hand is held more or less rigid and thus the possibility of the palm of the hand collapsing against the surface of the neck when the adjustment is delivered, is eliminated. The adjuster should lean in such a manner that the episternal notch is inferior to a perpendicular drawn to the surface of the neck at the point of contact. In order to do this, he must lean well away from his patient and well toward the inferior. After seeing that the arms and shoulders are properly relaxed the adjustment is delivered, taking into consideration the unusual position of the cervical vertebrae due to the turning of the patient's face.

If the adjuster is standing upon the left side of the patient, he should see that the patient's face is turned toward the right. He should then assume a standing position opposite the trunk of the patient, his back to the patient and the right foot forward and both legs resting against the patient's body. After placing the right hand upon the head of the patient, palpation is made with the left hand, held palm up and with the little finger leading. The inferior border of the bifurcation is then located with the second finger of the palpating hand, after which the first and third fingers are removed. The nail hand is now turned in such a manner that the palm of the hand faces downward and the pointer finger extends straight toward the superior. By doing this the right trapezius muscle

Cut 104

Correct Position for Posterior Inferior Subluxation of Axis With Adjuster Standing on the Left Side

is crowded toward the right and as a consequence, a more advantageous contact is procured for the nail hand.

The right hand is now placed, using nail point two and seeing that the metacarpal bone of the small finger lies at right angles to the line of the spine. The fingers of the nail hand should be permitted to rest firmly upon the neck and shoulders of the patient, thus offering a firmer contact and decreasing the possibility of slipping. The palm of the nail hand is held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact. The pointer finger is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand.

The shoulders, in this position, should be allowed to assume an easy, comfortable position but the arms should be equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the right elbow. By following this method, a rigidity is produced in the right wrist which could not be obtained in any other way. This rigidity prevents the possibility of the palm of the nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is inferior to a perpendicular drawn to the surface of the neck at the point of contact. This means that the adjuster must lean well away from his patient and well toward the inferior. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the unusual position of the cervical vertebrae due to the turning of the patient's face.

Posterior Right Superior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but the face of the patient must be turned in the direction indicated by the laterality.

If the adjuster is standing on the right side of the patient, he should assume a standing position well superior to the ver-

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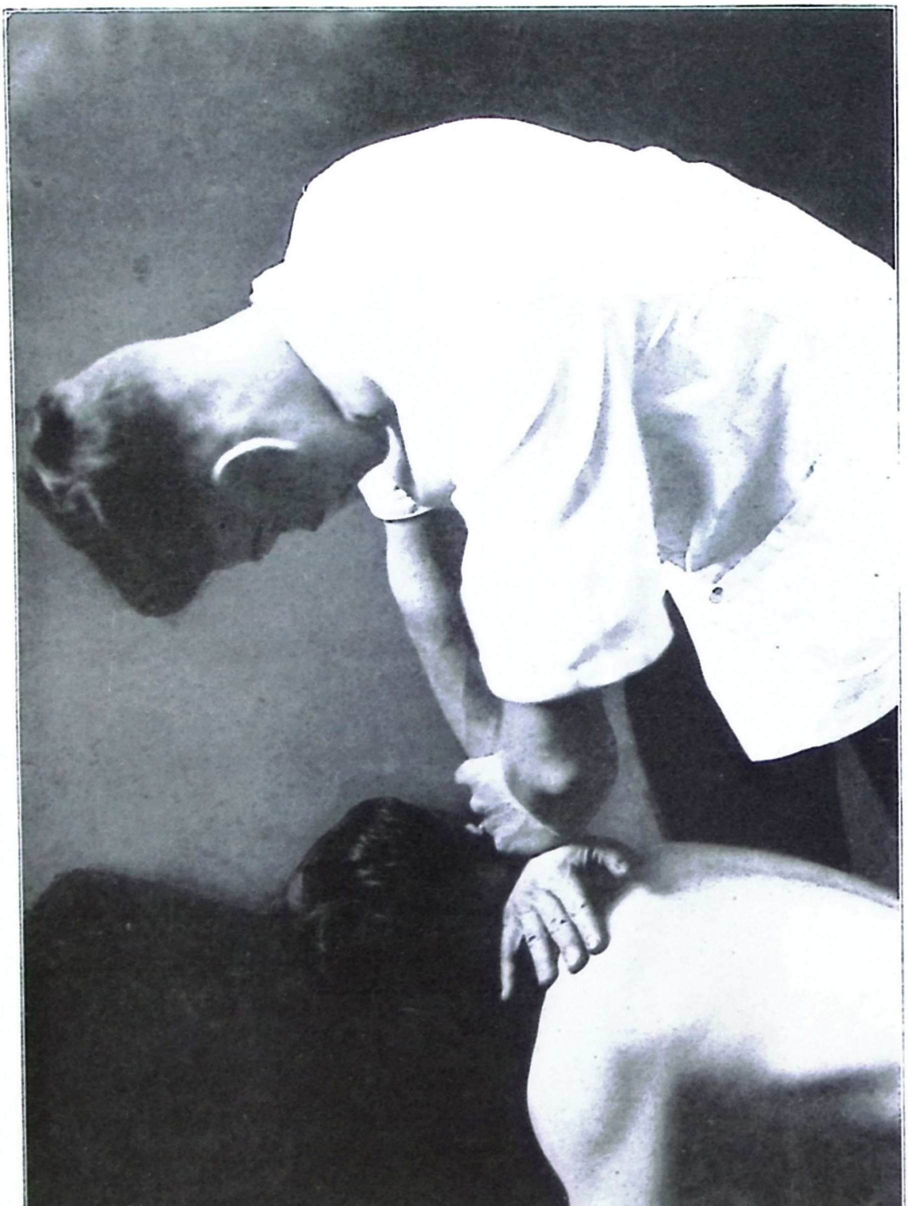

Correct Position for Posterior Right Superior Subluxation of Axis with Adjuster Standing on the Right Side

tebra in question to make his palpation. Palpation is made with the left hand, after placing the right hand upon the patient's head, and with the little finger leading. The posterior right and superior border of the right prong of the vertebra is located with the second finger of the palpating hand. The adjuster should now step to the inferior, opposite the patient's trunk, his right foot forward and with both legs resting against the patient's body. The nail hand is turned in such a manner that the palm faces downward and the second finger points directly toward the superior. By this method the right trapezius muscle is crowded to the right and a more advantageous contact is afforded for the nail hand. The right hand is now placed as the nail hand, care being taken to see that the metacarpal bone of the small finger extends at right angles to the line of the spine. The fingers of the nail hand should be permitted to rest firmly upon the neck and shoulders of the patient in order to offer a firm brace that the contact point may be more easily maintained. The palm of the nail hand should form an angle of approximately 60° with the surface of the neck at the point of contact.

The pointer finger should now be carefully removed and the left hand placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders of the adjuster should be allowed to assume an easy, comfortable position but the arms must be equally bent. Care should be taken to see that the elbows are held well away from the adjuster's body and particularly is this true of the right arm. By so doing, a rigidity is produced in the wrist of the nail hand which makes it impossible for the palm of that hand to collapse to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is right and superior to a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the unus-

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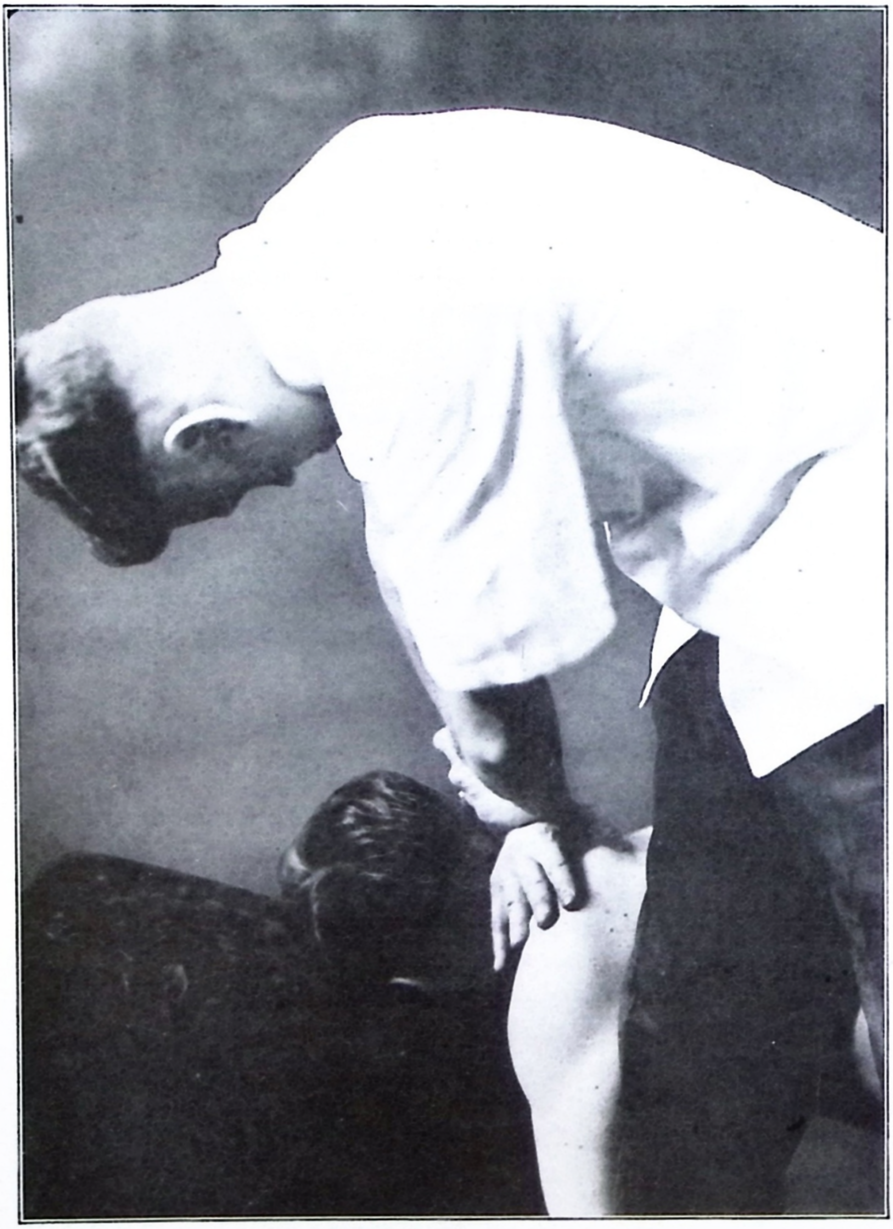

Correct Position for Posterior Right Superior Subluxation of Axis with Adjuster Standing on the Left Side

ual position of the cervical vertebrae due to the turning of the patient's face.

If the adjuster is standing upon the left side of the patient he should see that the patient's face is turned toward the right. He should assume a standing position opposite the trunk of the patient, with the right foot forward, his back to the patient and both legs resting against the patient's body. After placing the right hand upon the patient's head, the palpation is made with the left hand, palm up and with the little finger leading. The posterior right and superior border of the right prong of the vertebra is located with the second finger of the palpating hand. The first and second fingers are now removed and the left hand is turned in such a manner that the palm faces downward and the second finger points directly toward the superior. By this method the right trapezius muscle is crowded to the right and a more advantageous contact is offered for the placing of the nail hand. The right hand is now placed as the nail hand using nail point two and care being taken to see that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the surface of the patient's neck and shoulder. The palm of the nail hand is held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The pointer finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders of the adjuster should be allowed to assume an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the right elbow. By so doing; a rigidity is produced in the wrist of the nail hand which makes it impossible for that hand to collapse to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is to the right and

superior of a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed the adjustment is given, taking into consideration the unusual position of the cervical vertebrae due to the turning of the patient's face.

Posterior Right Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but the patient's face must be turned in the direction indicated by the laterality.

If the adjuster is standing upon the right side, he should assume a position superior to the vertebra in question. After placing the right hand upon the patient's head, the palpation is made with the left hand and with the little finger leading. The posterior right and inferior border of the right prong of the vertebra is located with the second finger of the palpating hand and the first and third fingers are then removed. The adjuster should step well to the inferior opposite the trunk of the patient, facing him, with the right foot forward and with both legs resting against the patient's body. The left hand should be turned in such a manner that the palm faces downward and that the second finger points directly toward the superior. By this method the right trapezius muscle is crowded toward the right and a more advantageous contact is thus afforded for the placing of the nail hand. The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck and shoulder of the patient. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The pointer finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, seeing that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders should be allowed to assume an easy, comfortable position but the arms must be

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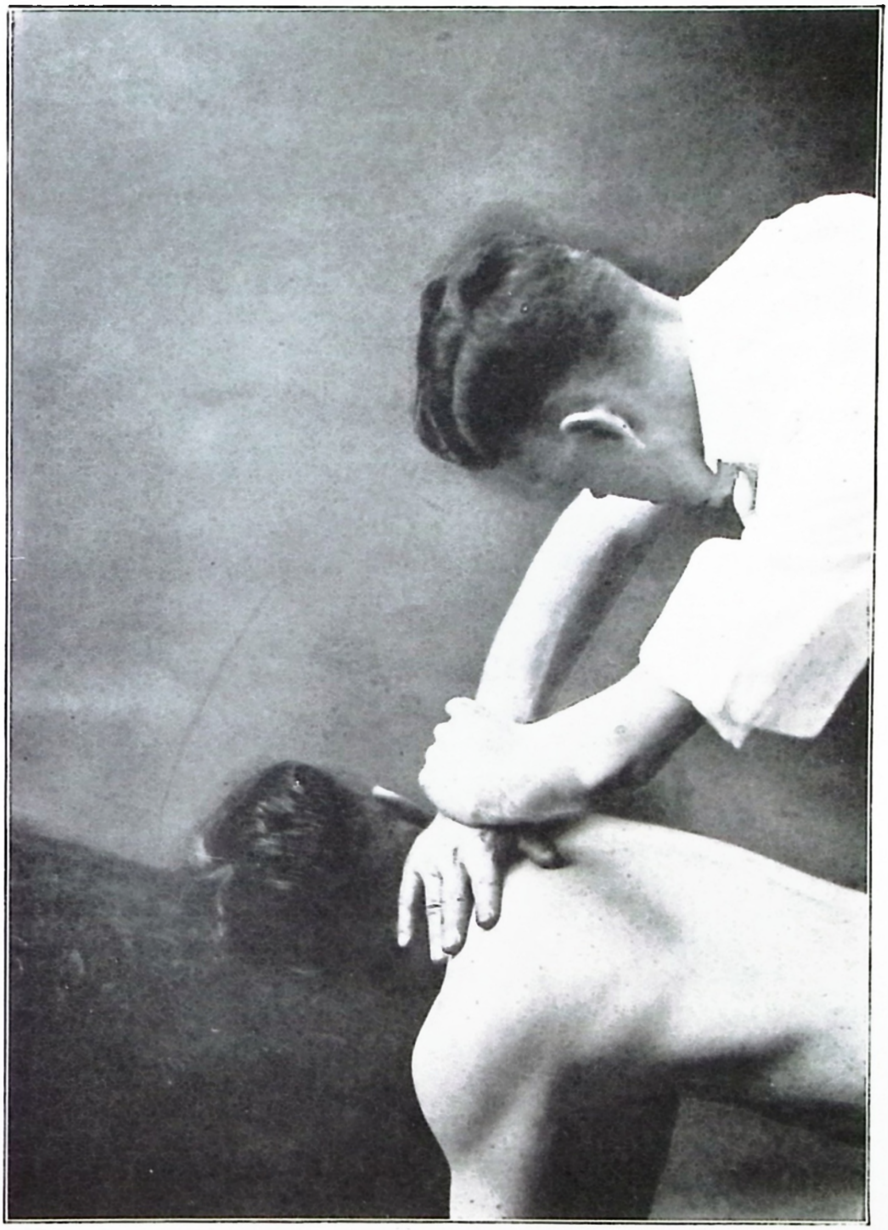

Correct Position for Posterior Right Inferior Subluxation of Axis with Adjuster Standing on the Right Side

equally bent. Care should be taken to see that the elbows are held well away from the adjuster's body and particularly is this true of the right elbow. When this is done a rigidity is produced in the wrist of the nail hand which does not permit it to collapse to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is right and inferior to a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the usual position of the cervical vertebrae due to the turning of the patient's head.

If the adjuster is standing upon the left side of the patient, he should see that the patient's face is turned toward the right. He should then assume a standing position inferior to the vertebra in question opposite the trunk of the patient, the right foot forward, his back to the patient and both legs resting against the patient's body. After placing the right hand upon the patient's head, the palpation is made with the left hand held palm up and with the little finger leading. The posterior right and inferior border of the right prong of the vertebra is located with the second finger of the left hand and the first and third fingers are then removed. The left hand is now turned in such a manner that the palm faces downward and the second finger extends straight toward the superior. By this method the right trapezius muscle is crowded toward the right and thus a more advantageous contact is afforded for the placing of the nail hand.

The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly against the neck and shoulder of the patient in order that a firm contact may be maintained when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it

Cut 108

Correct Position for Posterior Right Inferior Subluxation of Axis with Adjuster on the Left Side

forms an angle of approximately 30° with the surface of the neck at the point of contact.

The pointer finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders, in this position should be allowed to assume an easy, natural position but the arms must be equally bent. The elbows should be held well away from the body of the adjuster and particularly is this true of the right elbow. By this method a rigidity is produced in the wrist of the nail hand which serves to keep the palm of the hand from collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is to the right and inferior to a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the cervical vertebrae due to the turning of the patient's head.

Posterior Left Superior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the left.

If he is standing on the right side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position inferior to the vertebra in question opposite the trunk of the patient, his left foot forward, his back to the patient and both legs resting against the patient's body. After placing the left hand upon the patient's head, palpation is made with the right hand held palm upward and with the little finger leading. The posterior left and superior border of the left prong of the vertebra is located with the second finger of the palpating hand and the first and third fingers are then removed. The palpating hand is turned in such a way that the palm faces downward and that the second finger is pointing straight toward the superior. By this method the left trapezius muscle is crowded toward the left

Cut 109

Correct Position for Posterior Left Superior Subluxation of Axis With Adjuster Standing on the Right Side

and a more advantageous contact is afforded for the nail hand. The left hand is then placed as the nail hand using nail point two and seeing that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck and shoulder of the patient in order to afford a more stable position for the contact point when the adjustment is delivered. The palm of the nail hand is held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The pointer finger of the right hand is now carefully removed and the right hand is placed as the hammer hand, seeing that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows are held well away from the adjuster's body and particularly is this true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is to the left and superior of a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the unusual position of the cervical vertebrae due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient, he should assume a standing position well superior to the vertebra in question and with the patient's face turned toward the left. After placing the left hand upon the head of the patient, palpation is made with the right hand and with the little finger leading. The posterior left and superior border of the left prong of the vertebra is located with the second finger of the palpating hand and the first and third fingers are then removed. The adjuster should now step to the inferior, opposite the trunk of the patient, his left foot forward, facing his pa-

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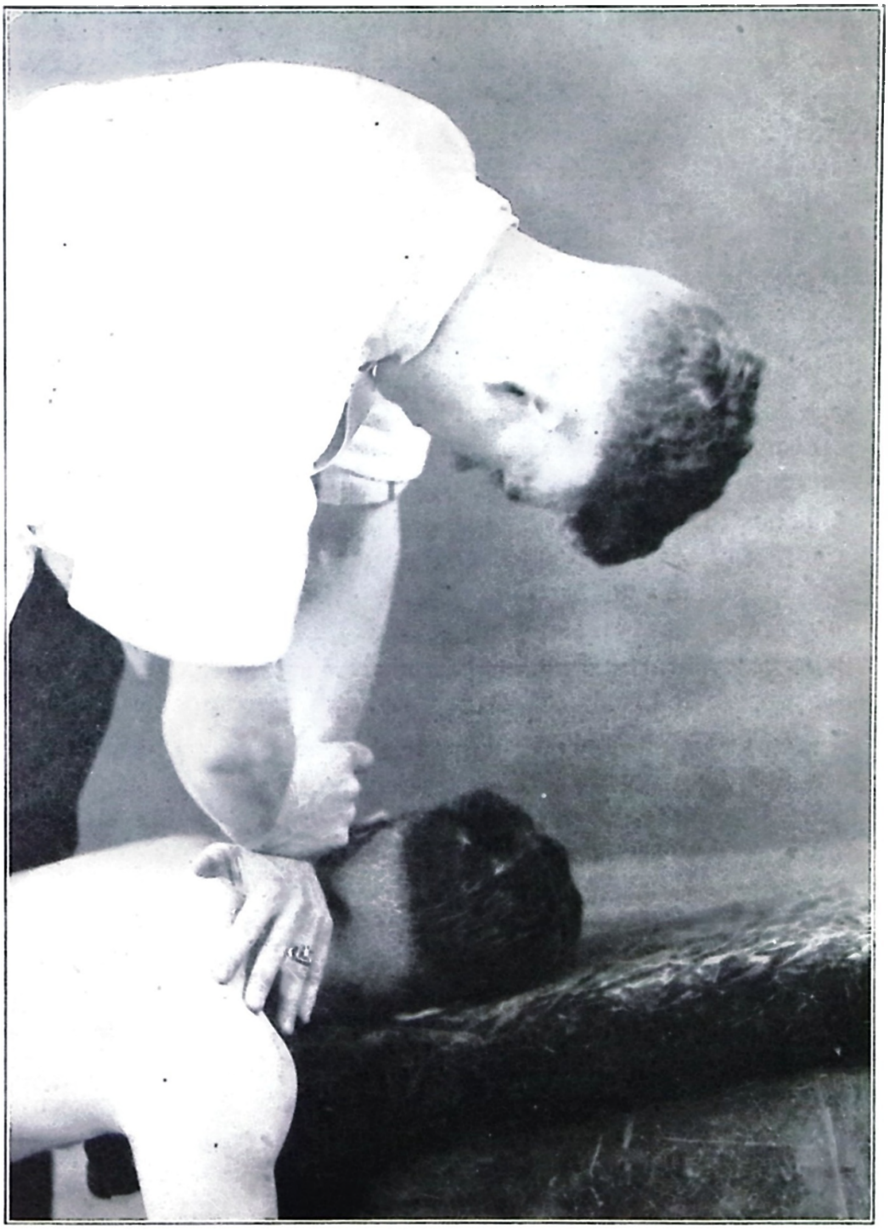

Correct Position for Posterior Left Superior Subluxation of Axis With Adjuster Standing on the Left Side

tient and with both legs resting against the patient's body. The right hand should be turned in such a manner that the palm faces downward and the second finger points straight toward the superior. By this method the left trapezius muscle is crowded to the left and a more advantageous contact is thus afforded for the left hand. The left hand is now placed as the nail hand, using nail point two and being careful to see that bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should rest firmly upon the neck and shoulder of the patient. The palm of the nail hand is held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The pointer finger of the right hand is now carefully removed and the right hand is placed as the hammer hand, seeing that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the body of the adjuster and particularly is this true of the left elbow. By this method, a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is left and superior to a perpendicular drawn to the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the unusual position of the cervical vertebrae due to the turning of the patient's face.

Posterior Left Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the left.

If the adjuster is standing on the right side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the vertebra in question, opposite the trunk of the patient,

Cut 111

Correct Position for Posterior Left Inferior Subluxation of Axis with Adjuster Standing on the Right Side

the left foot forward, his back to the patient and both legs resting against the patient's body. After placing the left hand on the patient's head, the palpation is made with the right hand, held palm upward and with the little finger leading. The posterior left and inferior border of the left prong of the vertebra is located with the second finger of the nail hand after which the first and third fingers are withdrawn. The right hand is now turned in such a manner that the palm faces downward and the second finger points directly toward the superior. By this method the left trapezius muscle is crowded toward the left and thus a more advantageous contact is produced for the nail hand. The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends directly across the spine at right angles. The fingers of the nail hand should rest firmly upon the neck and shoulder of the patient in order to afford a firmer contact for the nail point when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The pointer finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, comfortable position, but the arms must be equally bent. The elbows should be held away from the adjuster's body and this is particularly true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is left and inferior to a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consider-

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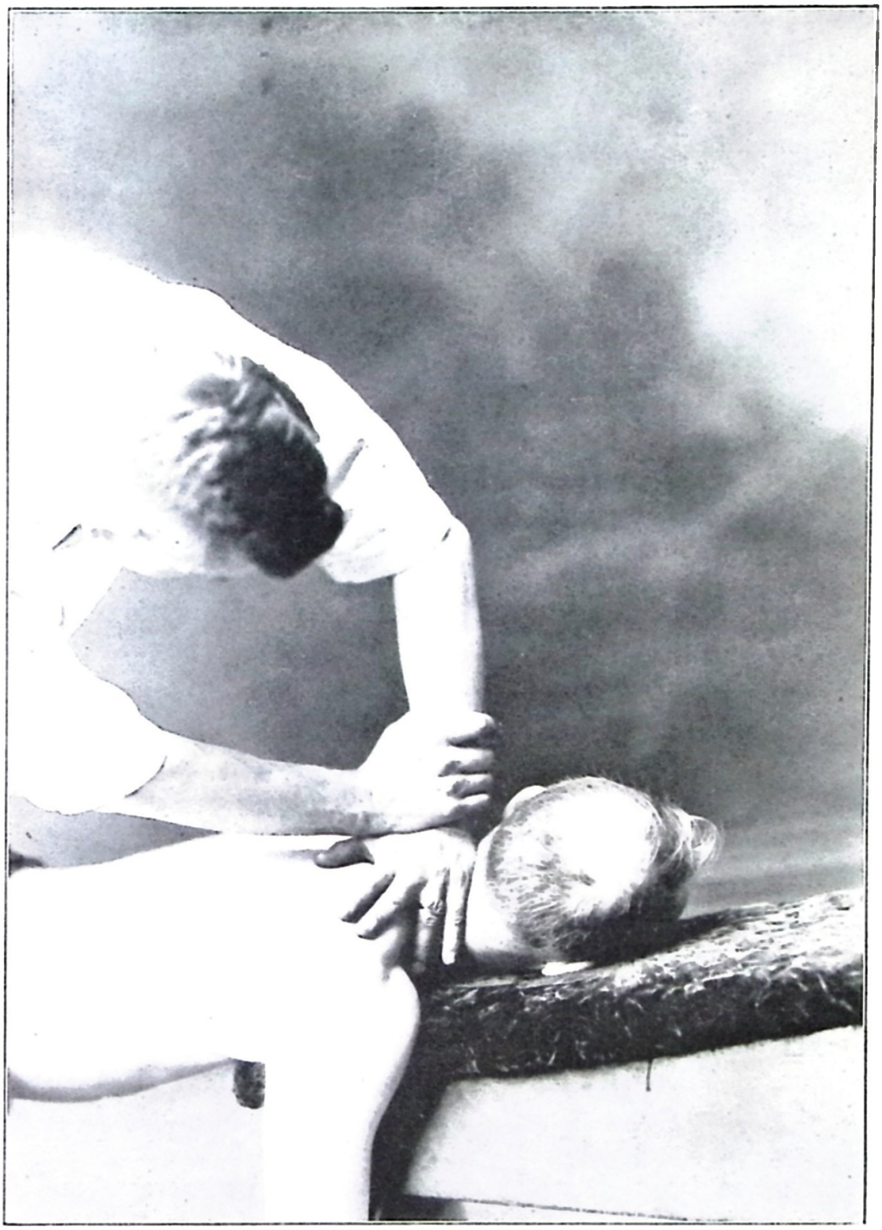

Correct Position for Posterior Left Inferior Subluxation of Axis with Adjuster Standing on the Left Side

ation the unusual position of the cervical vertebrae due to the turning of the patient's face.

If the adjuster is standing on the left side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well superior to the vertebra in question. After placing the left hand upon the patient's head, palpation is made with the right hand and with the little finger leading. The posterior left and inferior border of the left prong of the vertebra is located with the second finger of the right hand and the first and third fingers are withdrawn. The adjuster now assumes a standing position inferior to the vertebra in question, opposite the trunk of the patient, his left foot forward; facing his patient and both legs resting against the body of the patient. The right hand is now turned in such a manner that the palm faces downward and the second finger extends straight toward the superior. By this method the left trapezius muscle is crowded toward the left and a more advantageous contact is thus afforded for the placing of the nail hand. The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should rest firmly upon the neck and shoulder of the patient in order to form a brace, that the nail point may be held more firmly in contact when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The pointer finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The adjuster should see that the elbows are held well away from his body and particularly is this true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which prevents the palm of the nail hand from collapsing to

the surface of the neck when the adjustment is delivered. The shoulders should be permitted to assume an easy, comfortable position but the arms must be equally bent. The adjuster should lean in such a manner that the episternal notch is to the left and inferior of a perpendicular drawn to the surface of the neck at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the unusual position of the cervical vertebrae due to the turning of the patient's face.

General Considerations For the Above Subluxations. In the above group the adjuster has an unusual feature to consider in that the head of the patient makes a quarter turn as compared with the body. This serves to rotate all the vertebrae in the cervical group to a greater or less degree. Of the vertebrae in the above group however, the axis is rotated more than any other one and the fifth cervical vertebra is rotated less than any other one. The only way that the adjuster can get the best results in adjusting the vertebrae in this group is to form a mental picture of the degree to which each vertebra is rotated. Thus in a P. R. subluxation of the axis, the adjuster must lean in such a manner that the episternal notch is to the left of the median line of the patient's body. This is in order that posteriority may be included when the adjustment is delivered. The axis has made almost a quarter turn because of the turning of the patient's head, and thus, its posteriority would be at variance with the posteriority of the middle dorsal region. This is true of all cervical vertebrae in this group, although the posteriority of the axis is more at variance than that of any other one.

It will be noted also that in the above group the palm of the hand forms different angles with the surface of the neck at the point of contact, depending upon the existence of superiority or inferiority in the subluxation. It may be laid down as a general rule that where superiority is present in the vertebrae of this group, the palm of the hand should form an angle of approximately 60° with the surface of the neck at the point

of contact. Where inferiority exists, the palm of the hand should form an angle of approximately 30° with the surface of the neck at the point of contact. Where neither inferiority nor superiority exists, the palm of the hand should form an angle of approximately 45° with the surface of the neck at the point of contact.

It will be noted also that a great deal of stress has been laid in each of the above subluxations, on the necessity for holding the elbows well away from the adjuster's body. Particularly is this true of the elbow of the nail hand. This is because if the elbow of the nail hand is not held well away from the adjuster's body, the nail hand is very apt to collapse to the surface of the neck when the adjustment is delivered and thus much of the force which should be concentrated on nail point two is distributed to the entire palm of the hand. Then too, if the nail hand is permitted to collapse the contact upon the vertebra is lost and the force is not actually delivered on that surface of the spinous process where it should be concentrated.

Sometimes where it is found that one of the cervical vertebrae is extremely difficult to move it is well to flex the head of the patient backward in order that the bodies of the cervical vertebrae may be separated and less friction produced in moving them. When this procedure is resorted to, the flexion should be made after the contact surface has been located by the pointer finger of the palpating hand and before the nail point has been placed.

In the above subluxations, it will be noted that stress has been laid upon the necessity of crowding the trapezius muscle to the side before placing the contact point. If this is not done, the contact must be made through the trapezius muscle which offers a mass of tissue in a more or less contracted state between the contact surface of the vertebra and the nail point. Thus it is more difficult to place the nail point in proper contact and some of the applied force is necessarily lost because of the heavy cushion which is thus interposed.

The nail hand should be placed by rolling it into its con-

tact. That is, the edge of the nail hand opposite the nail point two should be placed upon the finger nail of the pointer finger with the palm of the nail hand held upward and the back of the hand resting against the neck of the patient above the point of contact. Before the pointer finger is removed, this nail hand should be rolled, keeping its edge tightly placed on the neck at the tip of the pointer finger until the palm faces downward. By using this method, the trapezius muscle is held away from the point of contact and is not permitted to interpose itself between the nail hand and the vertebra to be adjusted.

Sometimes the question arises as to the possibility of placing nail point two upon a middle cervical vertebra particularly when the spinous processes in this region are small and when a lordosis exists. If all the spinous processes were in perfect alignment, this contention would be true, but it must be remembered that the vertebra involved extends either to the right or the left of those immediately above and below it and because of projecting in this manner, it is the one which receives the impact of the adjustment even though the nail point may over-lap it to the superior or inferior.

RECOIL ADJUSTMENT OF THE ATLAS.

Right Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the right.

If he is standing on the right side of the patient, the first thing to be considered is to see that the patient's face is properly turned toward the right. The adjuster should assume a standing position well inferior to the atlas, opposite the trunk of the patient, with the right foot forward, facing the patient and with both legs resting against the patient's body.

Palpation is made with both hands. The right transverse process of the atlas, located immediately behind the lobe of the ear is indicated by the second finger of the right hand. The bifurcation of the axis is located by the second finger of

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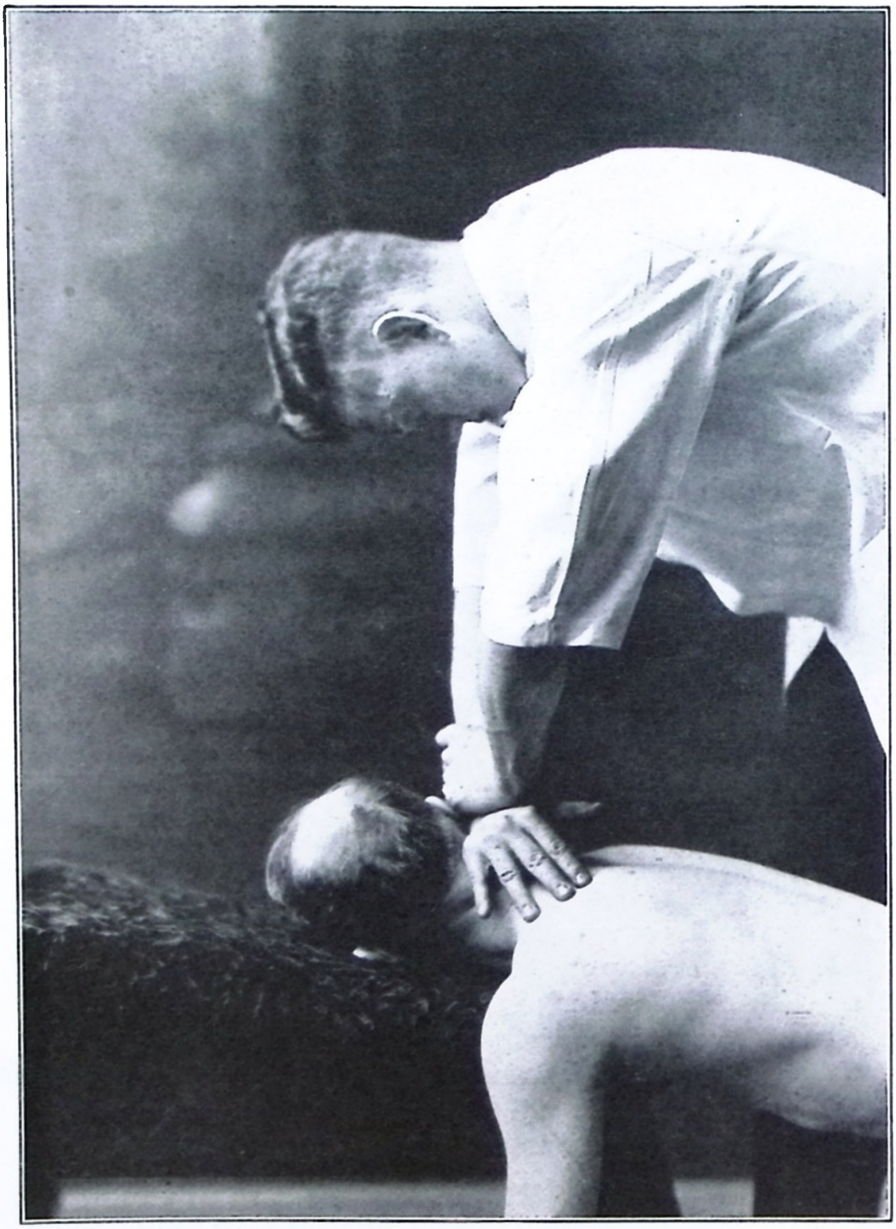


Correct Position for Right Subluxation of Atlas with Adjuster Standing on the Right Side

the left hand. The first and third fingers of both hands are now removed, leaving only the two second fingers indicating the tip of the right transverse process of the atlas and the bifurcation of the spinous process of the axis. With the first finger of the hand palpating the axis a point is now located midway between the two second fingers and in line with them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a certain spot on the neck which is to become the contact point. The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends at right angles, straight across the neck, to the spine. The fingers of the nail hand should be permitted to rest firmly on the neck of the patient, thus affording a proper brace to eliminate the possibility of losing or changing the contact point when the adjustment is delivered. The nail hand should be held in such a manner that the palm forms an angle of approximately 45° with the surface of the neck at the point of contact.

The pointer finger of the left hand is now withdrawn and the left hand placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, natural position but the arms must be equally bent. Care should be taken to see that the elbows are held well away from the body of the adjuster and this is particularly important with the right elbow. By this method a rigidity is produced in the wrist of the nail hand which prevents the possibility of the palm of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch and nail point two form a line parallel to a line drawn between the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, dependent upon the turning of the patient's head.

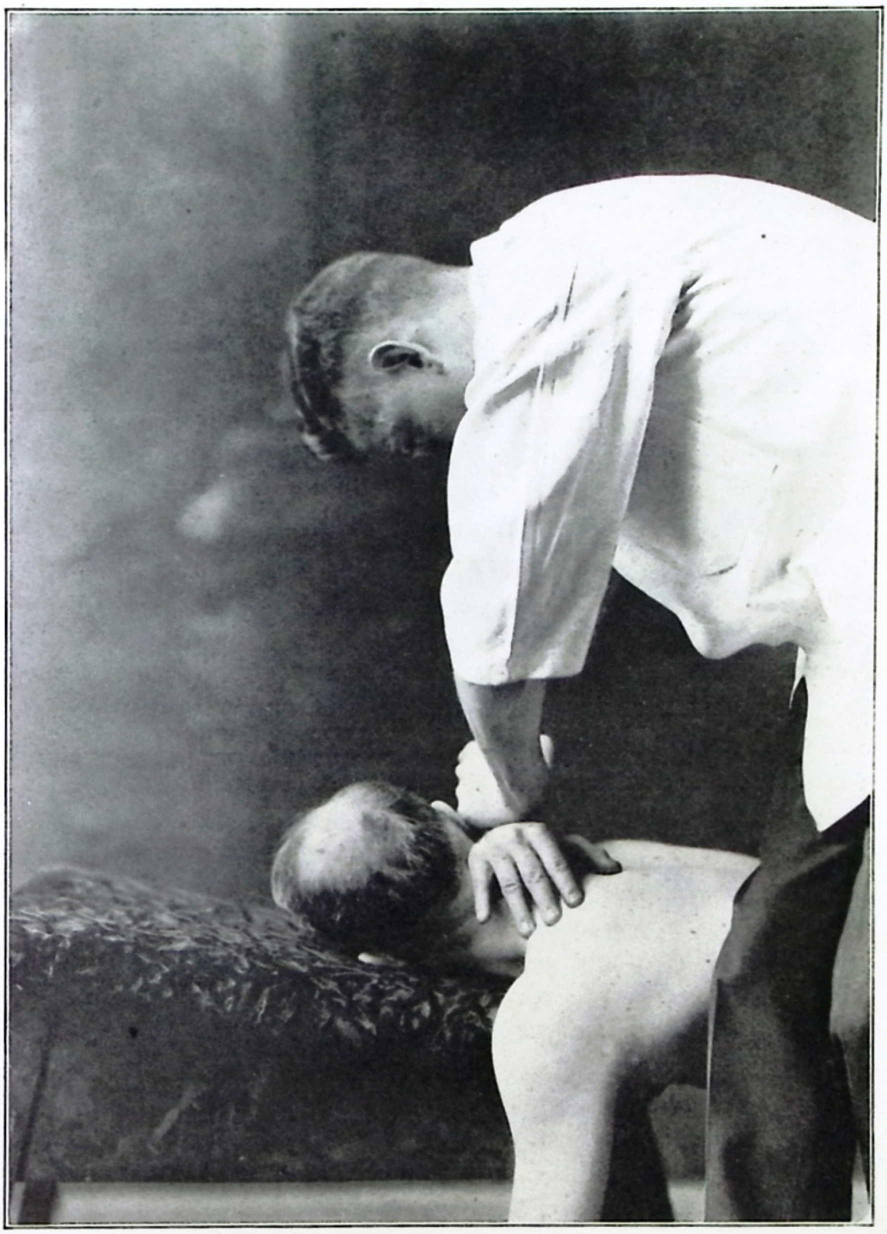
If the adjuster is standing on the left side of the patient,

he should first see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient, with the right foot forward, his back to the patient and both legs resting against the patient's body. Palpation is then made with both hands. The right transverse process of the atlas, which lies immediately behind the lobe of the right ear, is located with the second finger of the right hand. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now withdrawn leaving only the two second fingers indicating the right transverse process of the atlas and the spinous process of the axis. A division is now made half way between these two points and in line with them by the first finger of the left hand. The two second fingers are now removed and nothing remains but the first finger of the left hand which indicates the spot, later to become the contact point. The left hand is now brought so that the palm of the hand faces downward and the first finger points directly toward the superior.

The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends directly across the spine at right angles. The fingers of the nail hand should rest firmly upon the neck of the patient, in order to afford a proper brace that the contact point may be maintained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 45° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, comfortable position, but the arms must be equally bent. The elbows are held well away from the body of the adjuster and particularly is this true of the right elbow. By this method a rigidity is produced in the right wrist which eliminates the possibility of the

Cut 114



Correct Position for Right Subluxation of Atlas With the Adjuster Standing on the Left Side

nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch and nail point two form a line parallel to a line drawn between the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas, dependent upon the turning of the patient's head.

Right Anterior Subluxation. In this subluxation the adjuster must stand on the right side of the patient, and he should take care to see that his patient's face is turned toward the right. In making the palpation he should assume a standing position well inferior to the atlas opposite the trunk of the patient, with the right foot forward, facing his patient and with both legs resting against the patient's body. Palpation is made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear, by the second finger of the right hand. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are then removed leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found two-thirds of the distance from the spinous process of the axis and one-third the distance from the right transverse process of the atlas. This point is in line with the two points already held by the second fingers. Both second fingers are now removed, leaving only the first finger of the left hand, indicating a spot on the neck which is to become the contact point. The adjuster should now assume a standing position directly opposite the point of contact, facing his patient.

The right hand is now placed as the nail hand, using as the contact, a point midway between nail point one and nail point two. In this way the possibility of striking the mandible of the patient, when the adjustment is delivered, is eliminated. The adjuster should be careful to see that the meta-

Cut 115

Correct Position for Right Anterior Subluxation of Atlas

carpal bone of the small finger extends straight across the spine at right angles. He should also note that the fingers of the nail hand are permitted to rest firmly upon the neck of the patient in order to eliminate the possibility of altering his contact when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 45° with the surface of the neck at the point of contact.

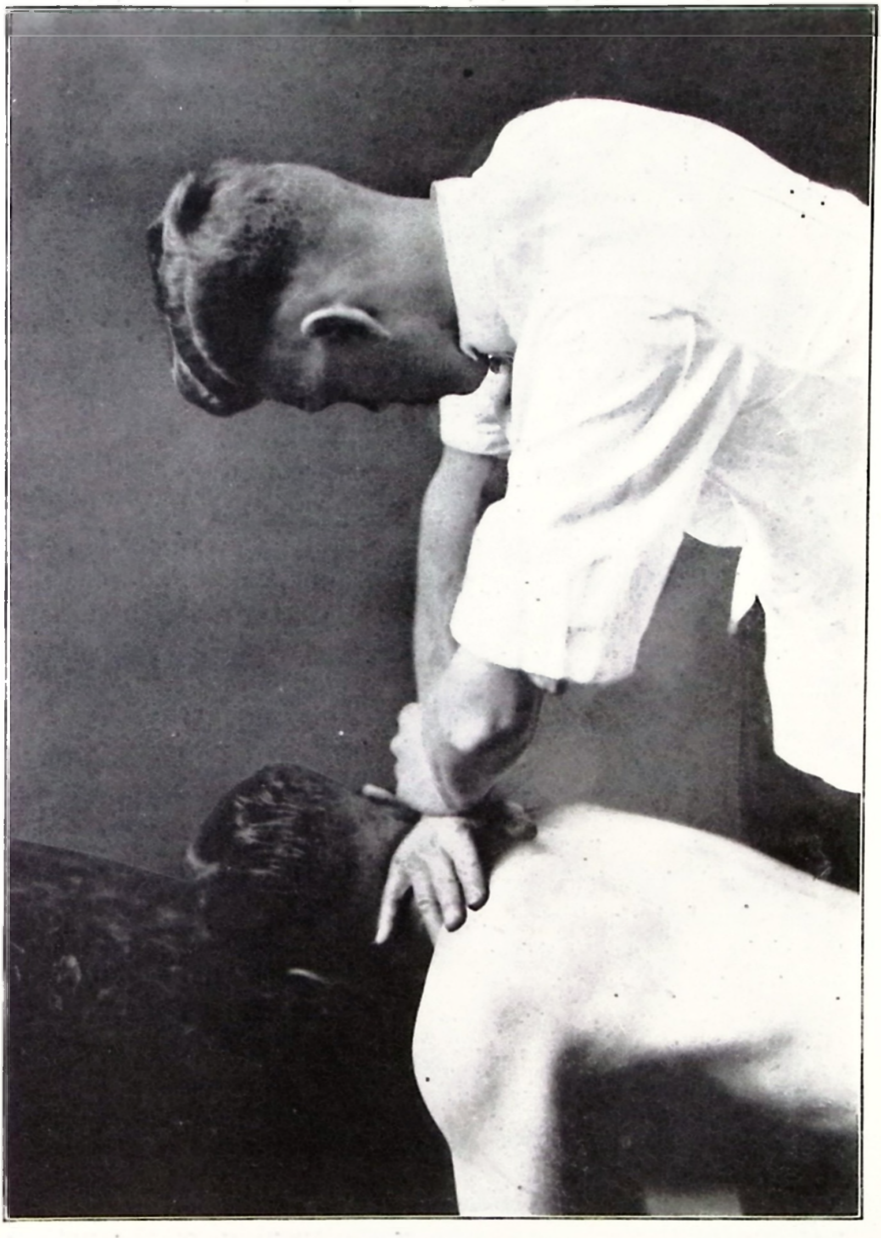
The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders of the adjuster should be held parallel to the line of the spine and the elbows also should be held parallel to the spine. By keeping both elbows well away from the adjuster's body, a rigidity of the nail hand wrist is produced which eliminates the possibility of the palm of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean backward in such a manner that the episternal notch is anterior to the line drawn between the two transverse processes of the atlas. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas caused by the turning of the patient's head.

Right Posterior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but the patient's face must be turned toward the right.

If the adjuster is standing on the right side of the patient, the first thing to consider is to see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient, with the right foot forward, facing his patient, and with both legs resting against the patient's body.

Palpation is made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear with the second finger of the right hand.

Cut 116

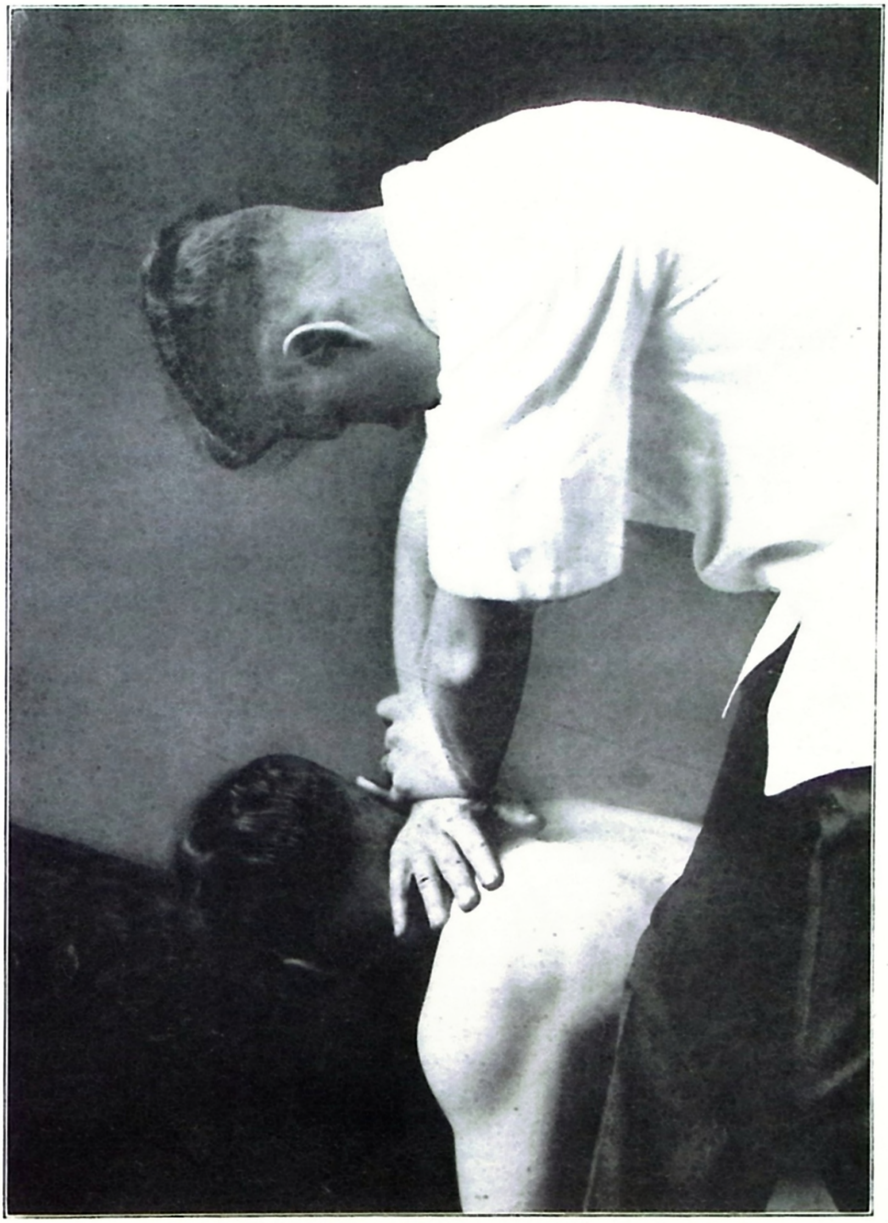


Correct Position for Right Posterior Subluxation of Atlas with Adjuster Standing on the Right Side

The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now withdrawn, leaving the two second fingers pointing to the right transverse of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now located, midway between the two second fingers and in line with them. Both second fingers are now withdrawn, leaving only the first finger of the left hand, indicating a spot on the neck which is to become the contact point. The right hand is now placed as nail hand, using nail point two and seeing that the metacarpal bone of the small finger lies directly across the spine at right angles. The fingers of the nail hand should be permitted to rest easily upon the surface of the neck in order that they may act as a brace and decrease the possibility of losing the contact point when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 45° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders, in this position should be permitted to assume an easy comfortable position, but the arms must be equally bent. Care should be taken that the elbows are held well away from the body of the adjuster and this is especially important with the right elbow. By this method, a rigidity is produced in the nail hand wrist which eliminates the possibility of the palm of the nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior to the line drawn through the two transverse processes of the atlas. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas caused by the turning of the patient's head.

Cut 117



Correct Position for Right Posterior Subluxation of Atlas with Adjuster Standing on the Left Side

If the adjuster is standing on the left side of the patient, he should first see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the right foot forward, his back to the patient and both legs resting against the patient's body.

Palpation is made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear by the second finger of the right hand. The bifurcation of the axis is located by the second finger of the left hand. The first and third fingers are then withdrawn, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now located half way between the right transverse process of the atlas and the spinous process of the axis and in line with them. Both second fingers are now withdrawn, leaving only the first finger of the left hand indicating a point on the neck which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order to afford a proper brace that the contact may be more readily held when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 45° with the surface of the neck.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows are held well away from the body of the adjuster and particularly is this important with the right elbow. By this method, a rigidity in

the wrist of the nail hand is produced which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas caused by the turning of the patient's head.

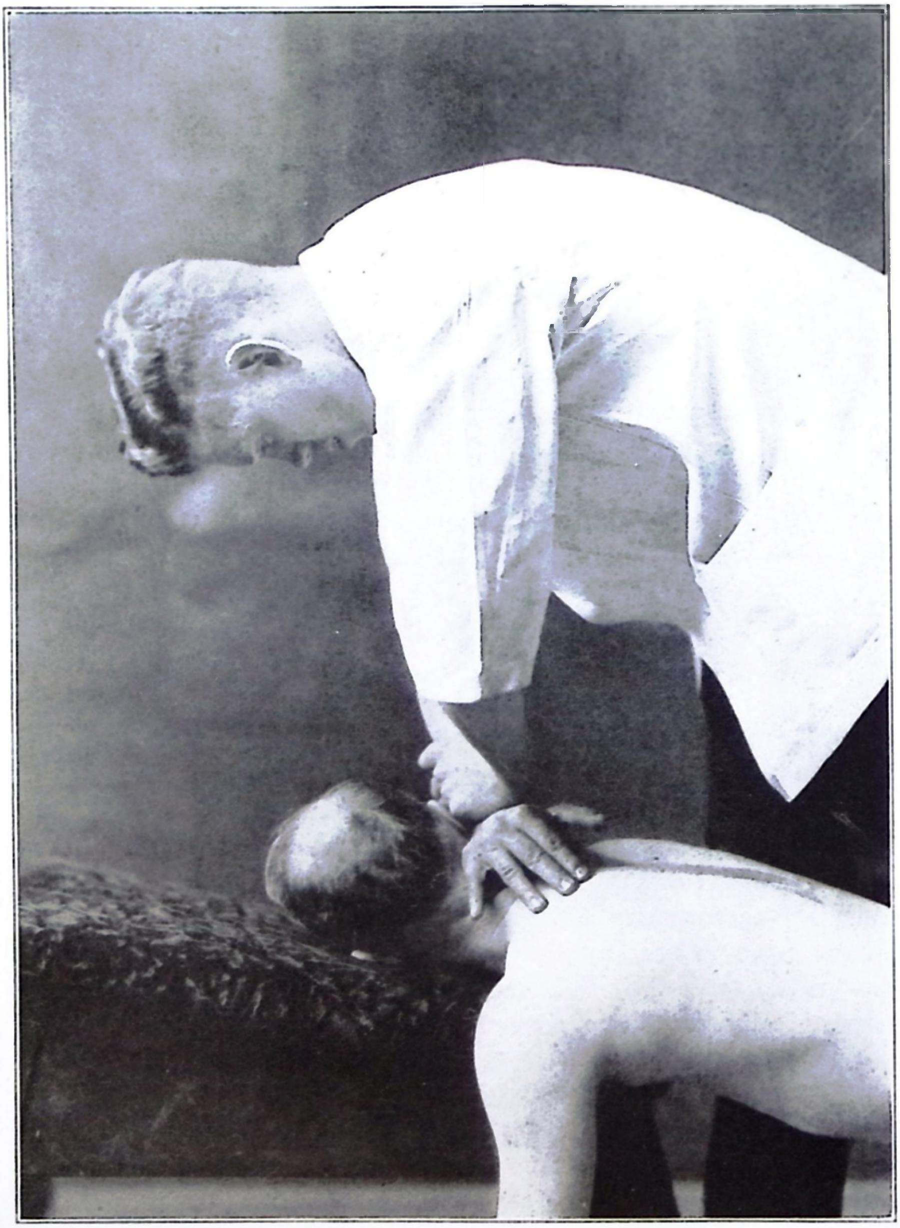
Right Superior Subluxation. In this subluxation, the adjuster may stand on either side of the patient but the patient's face must be turned toward the right.

If the adjuster is standing on the right side of the patient, he should first see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas opposite the trunk of the patient with the right foot forward, facing his patient and with both legs resting against the patient's body.

Palpation is now made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear with the second finger of the right hand. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now located midway between the tips of the two second fingers and one-fourth of an inch above the line drawn between them. Both second fingers are now removed, leaving only the first finger of the left hand pointing to a spot which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should rest firmly upon the surface of the neck in order that a proper brace may be formed to maintain the nail point in its proper position when the adjustment

Cut 118



Correct Position for Right Superior Subluxation of Atlas with Adjuster Standing on the Right Side

is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. In this subluxation, the shoulders should be held in such a manner that they cross the spine at right angles. The elbows also should be held so that they cross the spine at right angles and the arms must be equally bent. Both elbows should be held well away from the body of the adjuster, but particularly is this essential for the right elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of the palm of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is superior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, caused by the turning of the patient's head.

If the adjuster is standing on the left side of the patient, he should first see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas opposite the trunk of the patient, with his right foot forward, his back to the patient and with both legs resting against the patient's body.

The palpation is made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear by the second finger of the right hand. The bifurcation of the axis is located by the second finger of the left hand. The first and third fingers of both hands are now carefully removed, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand

Cut 119

Correct Position for Right Superior Subluxation of Atlas With Adjuster Standing on the Left Side

on the axis, a point is now located half way between the two second fingers and in line with their tips. The two second fingers are now withdrawn, leaving only the first finger pointing to a spot on the neck which is to become the contact point. The right hand is now placed as the nail hand using nail point two and seeing that the metacarpal bone of the small finger extends across the neck at right angles to the spine. The fingers of the nail hand should be permitted to rest firmly on the neck of the patient in order to afford a brace that the nail point may be more firmly held when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms of the adjuster should be held at right angles to the patient's spine and care should be taken to see that both arms are equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the right elbow. This method produces a rigidity of the nail hand wrist which is essential in preventing the palm of the nail hand from collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is superior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head

Right Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the right.

If he is standing on the right side of the patient, the first consideration is to see that the patient's face is turned toward the right. The adjuster assumes a standing position well in-

ferior to the atlas, opposite the trunk of the patient with the right foot forward, facing his patient and both legs resting against the body of the patient. Palpation is now made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear with the second finger of the right hand. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the two second fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now removed, leaving the first finger of the left hand pointing to a spot which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and taking care that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order that a firmer contact may be maintained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. In this position the shoulders and arms should be held in such a manner that they extend across the spine at right angles. Care must be taken to see that the elbows of the adjuster are held well away from his body and particularly is this important for the right elbow. By this method the rigidity of the right wrist is produced which eliminates the possibility of the nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is inferior to the line drawn through the

Cut 120

Correct Position for Right Inferior Subluxation of Atlas With Adjuster Standing on the Right Side

Cut 121

Correct Position for Right Inferior Subluxation of Atlas With the Adjuster Standing on the Left Side

two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

If the adjuster is standing on the left side of the patient, he should first see that the patient's head is turned toward the right. He should then assume a standing position well inferior to the atlas opposite to the trunk of the patient with the right foot forward, his back to the patient and both legs resting against the patient's body. Palpation is now made with both hands. The right transverse process of the atlas is located with the second finger of the right hand immediately behind the lobe of the right ear. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now removed, leaving only the two second fingers pointing to the right transverse of the atlas and the spinous process of the axis. With the first finger of the left hand, a point is now found midway between the two second fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now withdrawn leaving only the first finger pointing to a spot on the neck which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly on the surface of the neck in order that a firmer contact may be maintained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms of the adjuster should extend across the body of the patient, approximately at right angles. The elbows should be

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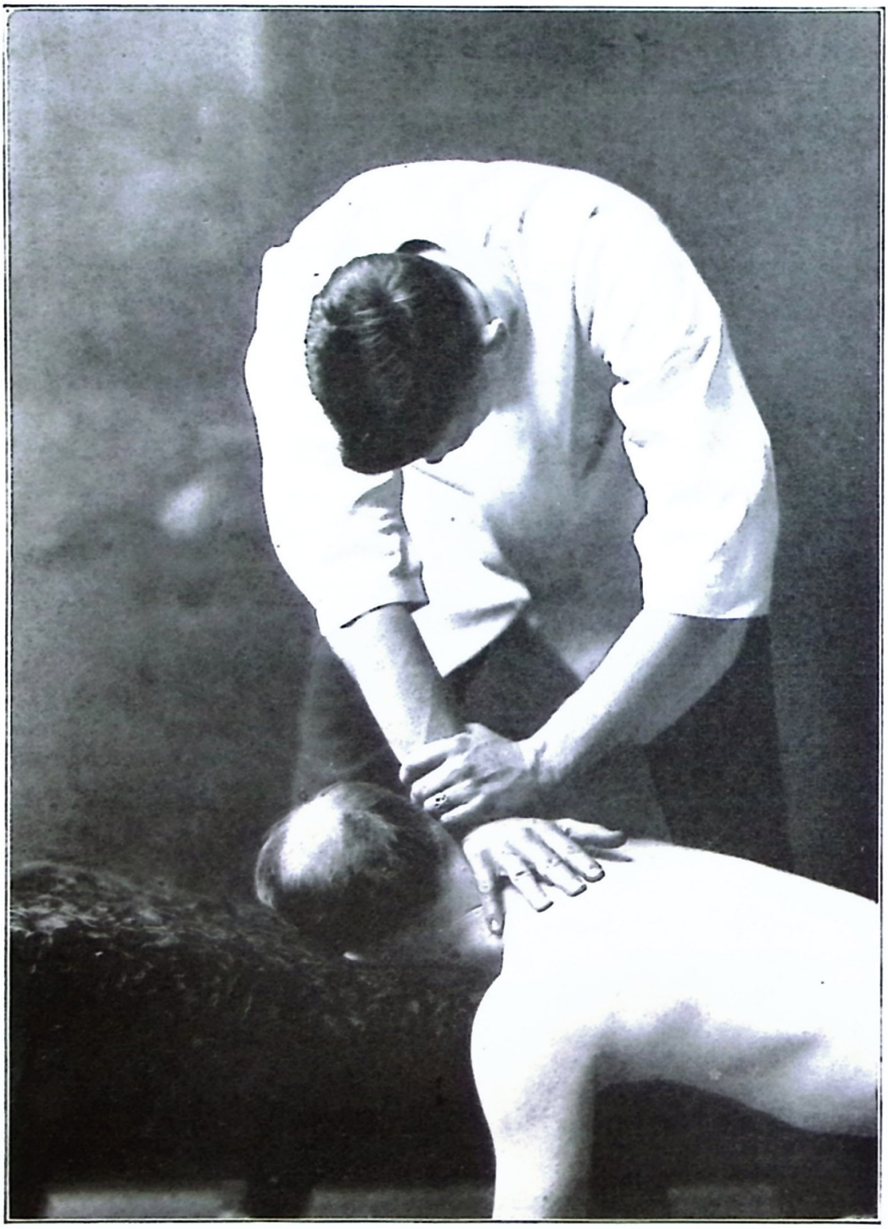

Correct Position for Right Anterior Superior Subluxation of Atlas

held well away from the adjuster's body and particularly is this important for the right elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of the palm collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is inferior to a line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the altered position of the atlas due to the turning of the patient's head.

Right Anterior Superior Subluxation. In this subluxation, the adjuster must stand on the right side of the patient and his first consideration should be to see that the patient's head is turned toward the right.

In making the palpation, he should assume a standing position well inferior to the atlas, opposite the trunk of the patient with the right foot forward, facing the patient and with both legs resting against the patient's body. Palpation is now made with both hands. The right transverse process of the atlas is located immediately behind the lobe of the right ear with the second finger of the right hand. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers are now withdrawn leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found one-third of the distance from the right transverse process of the atlas. This point should also be one-fourth of an inch above the line drawn between the two tips of the second fingers. The two second fingers are now withdrawn, leaving only the first finger of the left hand pointing to a spot on the neck which is to become the contact point.

The adjuster now assumes a position directly opposite the point of contact and the right hand is placed as the nail hand. The contact point on the hand is found midway between nail point two and the pisiform bone. In this manner,

the danger of striking the jaw or ear with the pisiform bone of the nail hand is eliminated. Care should be taken to see that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly on the surface of the neck in order that a firmer contact may be maintained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders are held in such a manner that they are parallel to the spine but the right shoulder is held somewhat lower than the left with both arms equally bent. In assuming this position the adjuster must lean slightly toward the superior. The elbows are held well away from the adjuster's body and particularly is this important for the right elbow. By this method, a rigidity is produced in the wrist of the nail hand which prevents the palm of the hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is anterior and superior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Right Anterior Inferior Subluxation. In this subluxation the adjuster must stand on the right side of the patient and his first consideration should be to see that the patient's face is turned toward the right.

He should assume a standing position well inferior to the atlas, opposite the trunk of the patient, the right foot forward facing his patient and with both legs resting against the patient's body. Palpation is made with both hands. The right transverse process of the atlas is located with the second finger

Cut 123

Correct Position for Right Anterior Inferior Subluxation of Atlas

of the right hand immediately behind the lobe of the right ear. The spinous process of the axis is located with the second finger of the left hand. The first and third fingers are now withdrawn, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found two-thirds of the distance from the spinous process of the axis and one-third the distance from the right transverse process of the atlas. This point should be one-fourth of an inch below the line drawn between the tips of the two fingers. The two second fingers are now withdrawn, leaving only the first finger pointing to a spot on the neck which is to become the contact surface.

The adjuster should now assume a standing position still to the inferior but away from the body of the patient. The right hand is now placed as the nail hand, using for the contact a point midway between the nail point two and the pisiform bone. By this method, the possibility of striking the jaw of the patient with the pisiform bone of the nail hand is eliminated. The nail hand should be held in such a manner that the metacarpal bone of the small finger forms an angle of approximately 90° with the line of the spine. The fingers of the nail hand should be permitted to rest firmly upon the surface of the neck in order that a firmer contact may be maintained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully removed and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and elbows of the adjuster should be permitted to extend obliquely across the patient's spine, at an angle of approximately 35°. The arms should be equally bent and the adjuster should see that the elbows are held well away from the adjuster's body. By this method the wrist of the nail hand is made rigid and

the possibility of the palm of that hand collapsing to the surface of the neck when the adjustment is delivered is thereby eliminated. The adjuster should lean in such a manner that the episternal notch is anterior and inferior to the line drawn between the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Right Posterior Superior Subluxation. This subluxation may be adjusted from either side of the patient, but the adjuster must see that the patient's face is turned toward the right.

If he is standing on the right side of the patient, his first consideration should be to see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas opposite the trunk of the patient with the right foot forward, facing his patient, with both legs resting against the patient's body. The palpation is then made with both hands. The right transverse process of the atlas is located with the second finger of the right hand, immediately behind the lobe of the right ear. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now withdrawn leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the two pointer fingers and one-fourth of an inch above the line drawn between them. Both second fingers are now withdrawn, leaving only the first finger of the left hand pointing to a spot on the neck which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and taking care that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the patient's neck in order that the proper contact may be

Cut 124

Correct Position for Right Posterior Superior Subluxation of Atlas with Adjuster Standing on the Right Side

maintained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows are held well away from the body of the adjuster and particularly is this true of the right elbow. By this method, a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior and superior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

If the adjuster is standing on the left side of the patient, he should first see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas and opposite the trunk of the patient, with the right foot forward, his back to the patient and both legs resting against the patient's body. Palpation is now made with both hands. The right transverse process of the atlas is located with the second finger of the right hand immediately behind the lobe of the right ear. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now removed, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tips of the two second fingers and one-fourth of an inch above the line drawn between them. The two second

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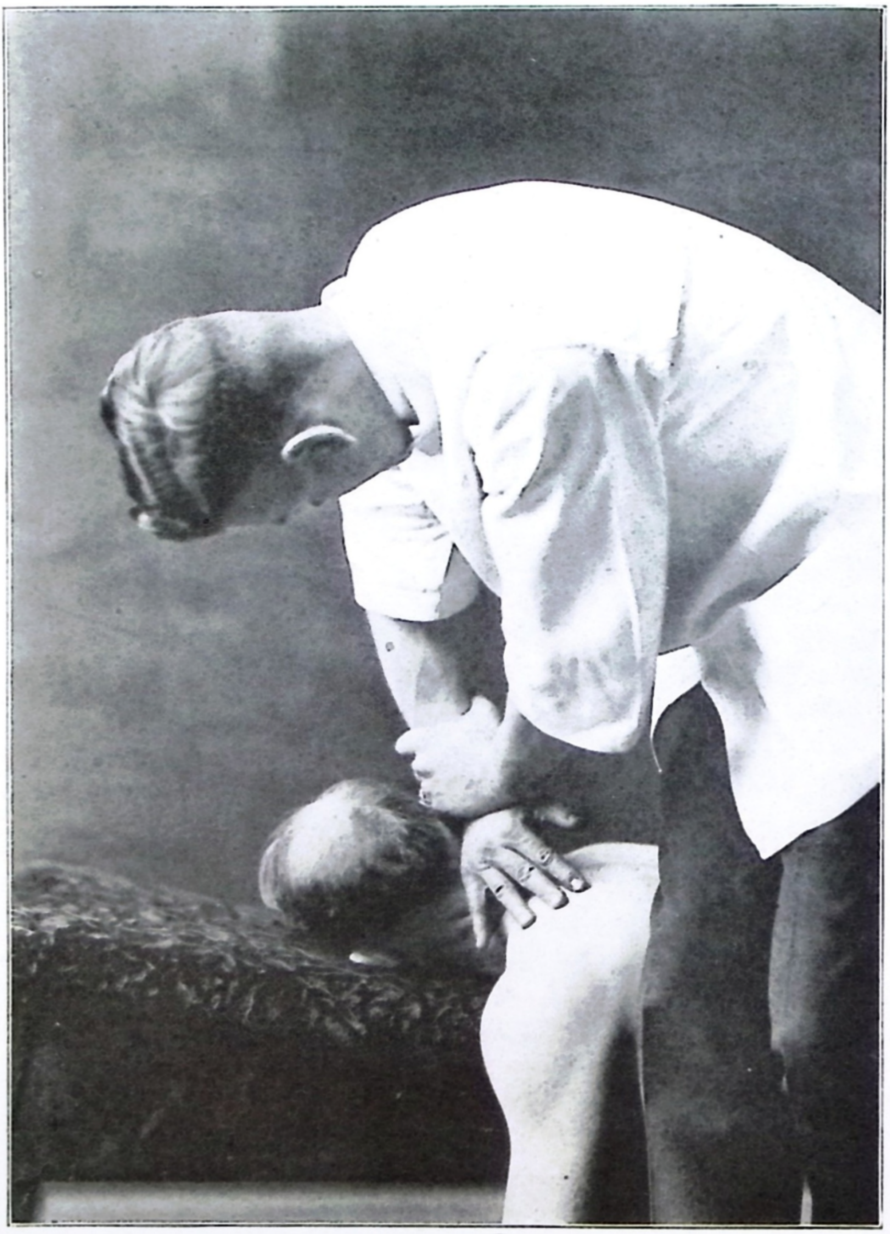

Correct Position for Right Posterior Superior Subluxation of Atlas with Adjuster Standing on the Left Side

fingers are now withdrawn, leaving only the first finger pointing to a spot on the neck which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be firmly placed upon the neck of the patient in order that a more stable contact may be afforded when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the body of the adjuster and particularly is this true of the right elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior and superior to a line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Right Posterior Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the right.

If he is standing on the right side of the patient, his first consideration should be to see that the patient's face is turned toward the right. He then assumes a standing position well inferior to the atlas, opposite the trunk of the patient with the right foot forward, facing his patient and both legs resting against the patient's body. Palpation is then made with both

Cut 126

Correct Position for Right Posterior Inferior Subluxation of Atlas with Adjuster Standing on the Right Side

hands. The right transverse process of the atlas is located with the second finger of the right hand and the bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now withdrawn leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the two tips of the second fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now withdrawn, leaving only the first finger of the left hand pointing to a spot which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and taking care that the metacarpal bone of the small finger extends directly across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order that the contact may be more efficiently retained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the right elbow. By this method a rigidity is produced in the right wrist which eliminates the possibility of the nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is inferior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

If the adjuster is standing on the left side of the patient, his first consideration should be to see that the patient's face is turned toward the right. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient, with the right foot forward, his back to the patient and with both legs resting against the patient's body. Palpation is then made with both hands. The right transverse process of the atlas is located with the second finger of the right hand. The bifurcation of the axis is located with the second finger of the left hand. The first and third fingers of both hands are now removed, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the left hand a point is now found midway between the two tips of the second fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now withdrawn, leaving only the first finger, pointing to a spot on the neck which is to become the contact point.

The right hand is now placed as the nail hand, using nail point two and taking care to see that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order to obtain a better footing when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows are held well away from the adjuster's body and particularly is this true of the right elbow. By this method the wrist of the nail hand attains a rigidity which prevents the palm of the hand from collapsing to the surface of the neck when the ad-

Cut 127

Correct Position for Left Subluxation of Atlas With Adjuster Standing on the Left Side

justment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior and inferior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas due to the turning of the patient's head.

Left Subluxation. In this subluxation the adjuster may stand on either side of the patient but the patient's face must be turned to the left.

If he is standing on the left side of the patient, his first consideration should be to see that the face of his patient is properly turned. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the left foot forward, facing his patient and with both legs resting against the patient's body. Palpation is then made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the left ear by the second finger of the left hand. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers are now carefully withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tips of the two second fingers and in line with them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends directly across the spine at right angles. The fingers of the nail hand should be firmly braced upon the neck of the patient in order that a more stable contact may be assured when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 45° with the surface of the neck at the point of contact.

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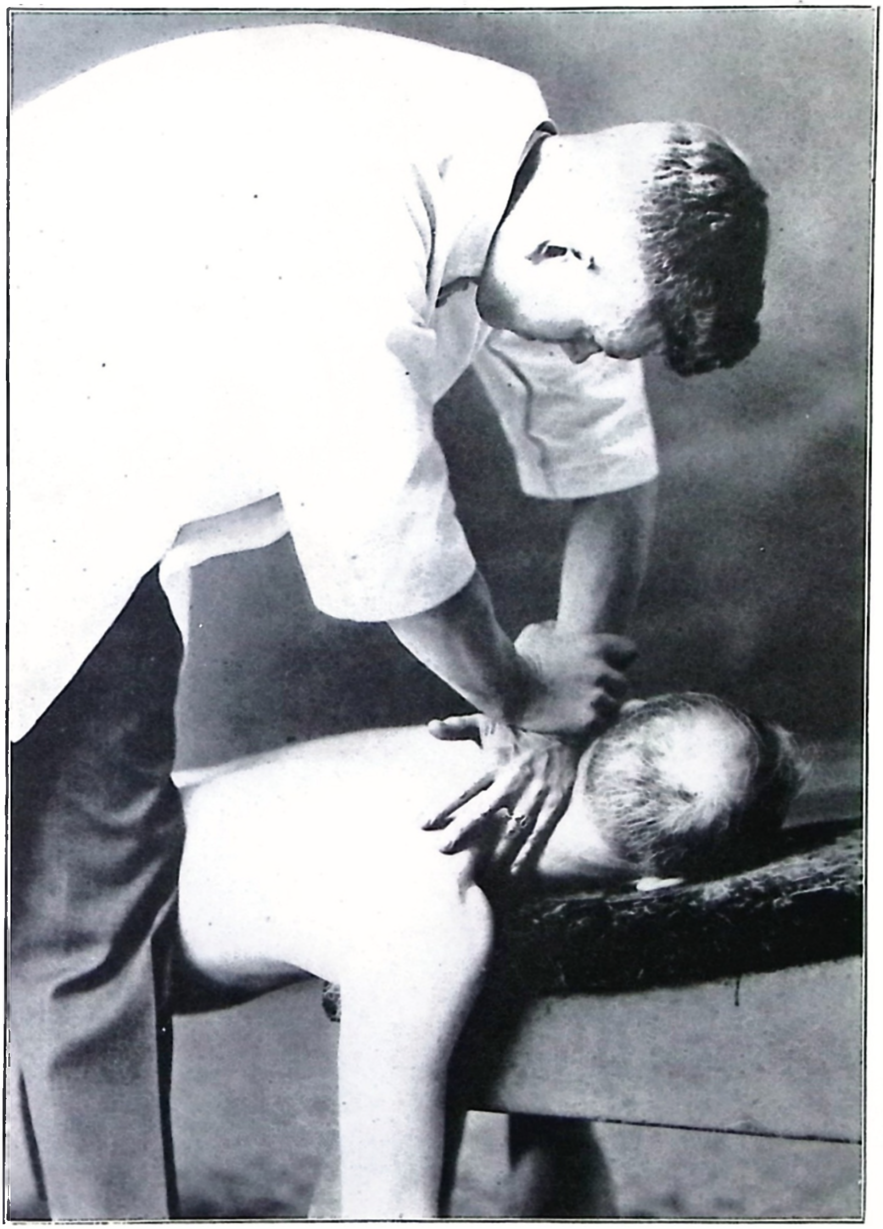

Correct Position for Left Subluxation of Atlas with Adjuster Standing on the Right Side

The first finger of the right hand is now carefully withdrawn, and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The arms and shoulders should be permitted to assume an easy, comfortable position but the arms must be equally bent. Both elbows should be held well away from the adjuster's body and particularly is this true of the left elbow. By this method a rigidity is established in the wrist of the nail hand which prevents that hand from collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that his episternal notch and nail point two form a parallel to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered, taking into consideration the altered position of the atlas, due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient, with his left foot forward, his back to the patient and both legs resting against the patient's body. The palpation is made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the left ear by the second finger of the left hand. The bifurcation of the axis is located with the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tips of the two pointer fingers and in line with them. The two second fingers are now carefully withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, using nail

point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient, in order that the contact may be properly retained when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 45° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn, and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The arms and shoulders should be held in such a manner that they are easy and comfortable, but the arms must be equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the left elbow. By this method, a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch and the nail hand form a line parallel to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Left Anterior Subluxation. In this subluxation the adjuster must stand on the left side of the patient and he must see that the patient's face is turned toward the left. To make the palpation he should assume a standing position well inferior to the atlas, opposite the trunk of the patient, with the left foot forward and both legs resting against the patient's body. The palpation is made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the ear with the second finger of the left hand. The spinous process of the axis is located with the right hand and its bifurcation is located with the second finger of that hand. The first and third fingers of both hands are now withdrawn, leaving

Cut 129

Correct Position for Left Anterior Subluxation of Atlas

only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found two thirds of the distance from the spinous process of the axis and one third the distance from the left transverse process of the atlas. The point is in line with these two processes. The two second fingers are now withdrawn, leaving only the first finger pointing to a spot on the neck which is to become the contact point.

The adjuster now assumes a standing position directly opposite the point of contact, facing his patient. The left hand is now placed as the nail hand, using a point midway between nail point two and the pisiform bone. This is in order that the pisiform bone will not come in contact with the ascending ramus of the jaw when the adjustment is delivered. The fingers of the nail hand should be permitted to rest firmly on the neck of the patient thus affording a brace which is advantageous in holding the contact point when the adjustment is delivered. The palm of the nail hand should form an angle of approximately 45° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms should be held in such a manner that they are parallel to the line of the spine. The arms must be equally bent and care should be taken to see that the elbows are held well away from the adjuster's body. Particularly is this important of the left elbow. By this method, a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is anterior to the line drawn through the two transverse processes and in order to do this he must lean directly away from his patient. After seeing that

Cut 130

Correct Position for Left Posterior Subluxation of Atlas With Adjuster Standing on the Left Side

the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the altered position of the atlas due to the turning of the patient's head.

Left Posterior Subluxation. This subluxation may be adjusted from either side but the adjuster must see that the patient's face is turned toward the left.

If the adjuster is standing on the left side of the patient, his first consideration should be to see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with his left foot forward, facing his patient and with both legs resting against the patient's body. Palpation is made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the left ear with the second finger of the left hand. The bifurcation of the axis is located with the second finger of the right hand. The first and third fingers are now withdrawn, leaving only two second fingers, pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the right hand, a point is now found half way between the tips of the two second fingers. The two second fingers are now carefully withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point. The left hand is now placed as the nail hand, care being taken to see that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the left hand should be permitted to rest firmly upon the neck of the patient, thus affording a proper contact for the delivery of the adjustment. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 45° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders

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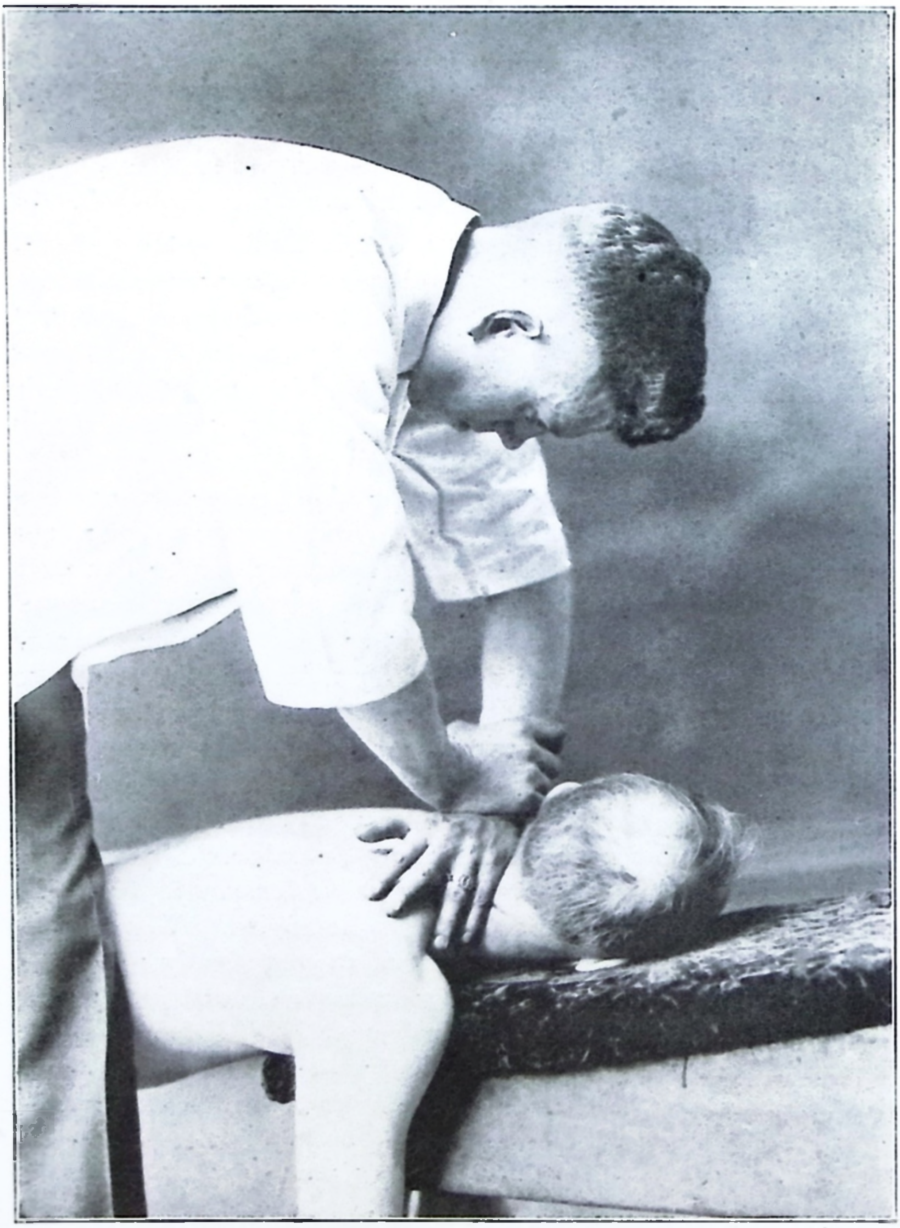

Correct Position for Left Posterior Subluxation of Atlas with Adjuster Standing on the Right Side

and arms of the adjuster should be held in an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand, which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas and opposite the trunk of the patient, with the left foot forward, his back to the patient and both legs resting against the patient's body. Palpation is made with both hands. The left transverse process of the atlas is located with the second finger of the left hand, immediately behind the lobe of the left ear. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found half-way between the tips of the two second fingers and in line with them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, care being taken to see that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly on the patient's neck in order to afford a proper brace for the contact

point when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 45° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms should be held in such a manner that they are in an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the body of the adjuster and particularly is this true of the left elbow. By this method, a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment should be delivered, taking into consideration the altered position of the atlas due to the turning of the patient's head.

Left Superior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the left.

If he is standing on the left side, his first consideration should be to see that the patient's face is properly turned. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the left foot forward, facing the patient and with both legs resting against the patient's body. Palpation is made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the left ear with the second finger of the left hand. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers of both hands are now carefully withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the

Cut 132

Correct Position for Left Superior Subluxation of Atlas With Adjuster Standing on the Left Side

spinous process of the axis. With the first finger of the hand on the axis, a point is now found half-way between the tips of the two second fingers and one-fourth of an inch above the line drawn between them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, care being taken to see that the metacarpal bone of the small finger extends directly across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order to afford a proper brace for the contact point when the adjustment is delivered. The nail hand should be held in such a manner that the palm of the hand forms an angle of approximately 60° with the surface of the neck.

The first finger of the right hand is now carefully withdrawn, and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held in such a manner that they extend directly across the spine at right angles and the arms should be equally bent. Both elbows should be held well away from the body of the adjuster and this is especially important of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is superior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the altered position of the atlas due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the left foot

Cut 133

Correct Position for Left Superior Subluxation of Atlas With Adjuster Standing on the Right Side

forward, his back to the patient and both legs resting against the patient's body. Palpation is made with both hands. The left transverse process of the atlas is located with the second finger of the left hand, immediately behind the lobe of the ear. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found half-way between the tips of the two second fingers and one-fourth of an inch above the line drawn between them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger is held across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck, thus affording a proper brace for the contact point when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held in such a manner that they extend straight across the spine at right angles and the arms should be equally bent. The elbows should be held well away from the adjuster's body and particularly is this true of the left elbow. By this method a rigidity is produced in the left wrist which eliminates the possibility of the nail hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is superior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are

properly relaxed, the adjustment is delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Left Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the left.

If he is standing on the left side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the left foot forward, facing his patient and both legs resting against the patient' body. The palpation is then made with both hands. The left transverse process of the atlas is located with the second finger of the left hand, immediately behind the lobe of the left ear. The bifurcation of the axis is located with the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tips of the two pointer fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now removed, leaving the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly on the neck of the patient in order to afford a firmer contact when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders

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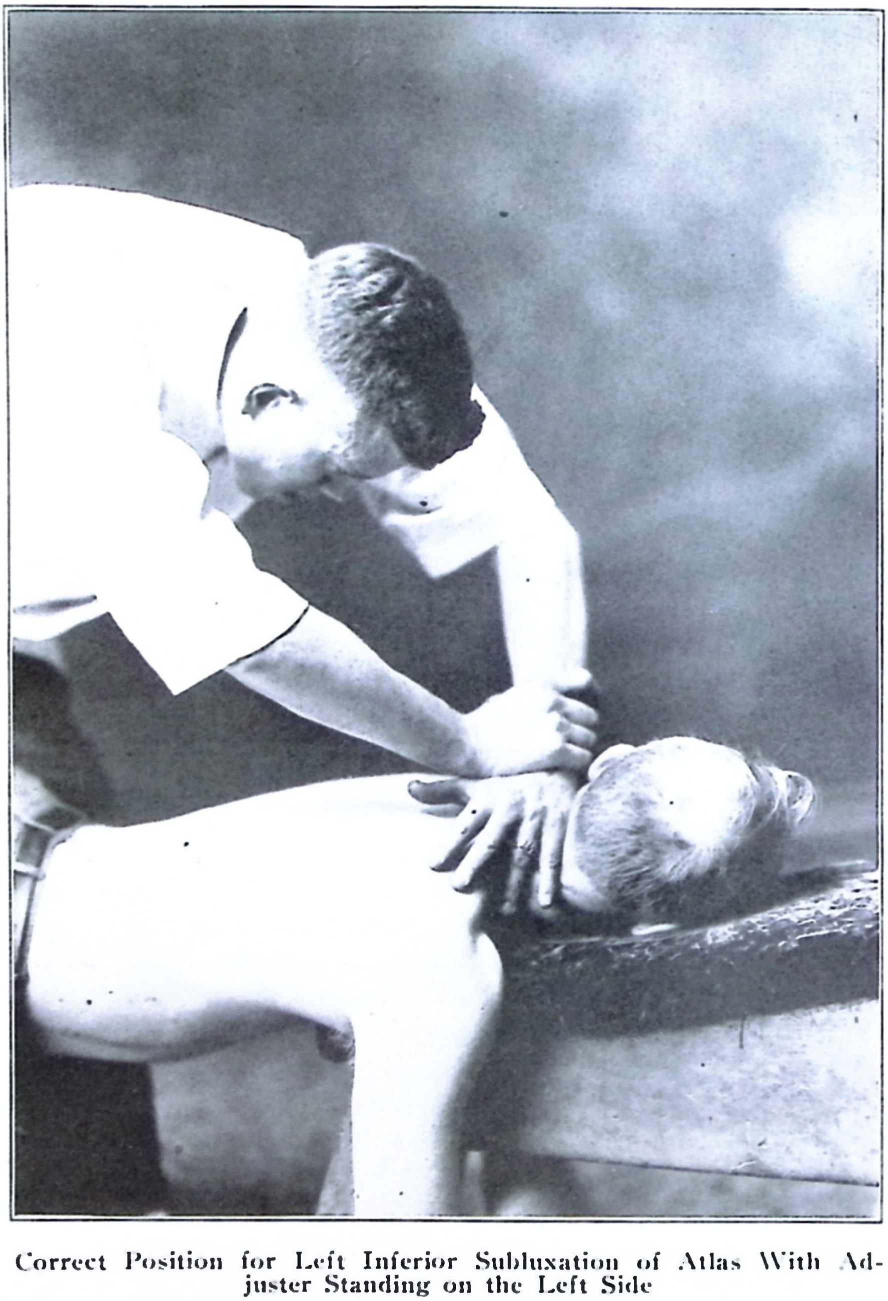

Correct Position for Left Inferior Subluxation of Atlas With Adjuster Standing on the Left Side

and arms of the adjuster should be held in such a manner that they extend across the spine approximately at right angles. The arms should be equally bent and the elbows should be held well away from the adjuster's body. This is particularly true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is inferior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the changed posittion of the atlas due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient, he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the left foot forward and his back to the patient with both legs resting against the patient's body. Palpation is then made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the left ear by the second finger of the left hand. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found half-way between the tips of the two second fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now removed, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point. The left hand is now placed as the nail hand using nail point two and seeing that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order to afford a firmer contact when the ad-

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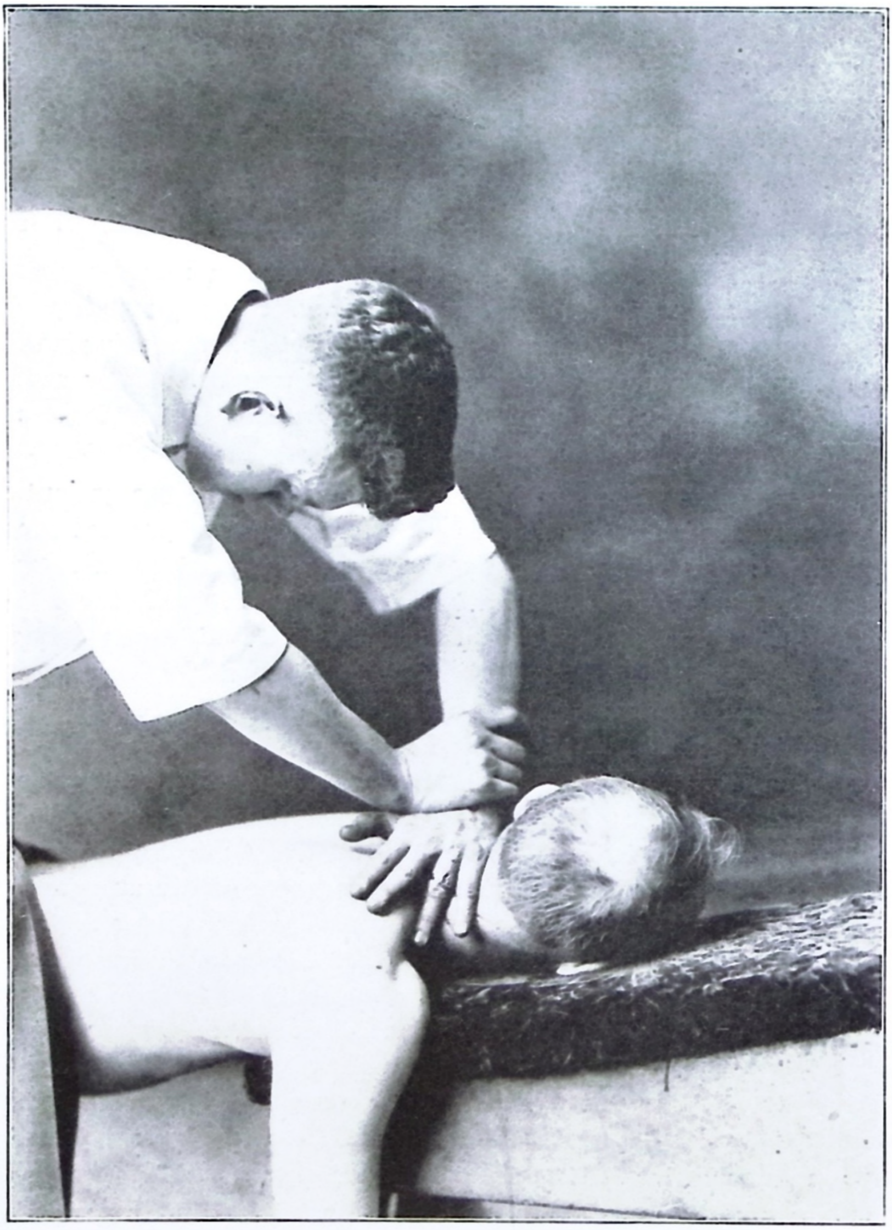

Correct Position for Left Inferior Subluxation of Atlas With Adjuster Standing on the Right Side

justment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should extend across the spine at right angles and the arms should be equally bent. Both elbows should be held well away from the adjuster's body and particularly is this true of the left elbow. By this method, a rigidity is produced in the wrist of the nail hand which prevents the palm of the nail hand from collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is inferior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the altered position of the atlas, due to the turning of the patient's head.

Left Anterior Superior Subluxation. · In this subluxation the adjuster must stand on the left side of the patient, and he must see that the patient's face is turned toward the left.

To make the palpation he should assume a standing position well inferior to the atlas opposite the trunk of the patient with the left foot forward, facing his patient and with both legs resting against the patient's body.

Palpation is made with both hands. The left transverse process of the atlas is located with the second finger of the left hand, immediately behind the lobe of the left ear. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found two-thirds of the distance from the axis and one-third the distance from the left transverse process of the at-

Cut 136

Correct Position for Left Anterior Superior Subluxation of Atlas

las. This is also one-fourth of an inch above the line drawn between the tips of the two second fingers. The two second fingers are now removed, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The adjuster should now assume a standing position directly opposite the atlas and facing his patient. The left hand is placed as the nail hand, using for the contact, a point midway between nail point two and the pisiform bone. This eliminates the possibility of the pisiform bone of the nail hand striking the jaw of the patient when the adjustment is delivered. The fingers of the nail hand should be held in such a manner that they rest firmly upon the surface of the neck in order to offer a proper brace for the contact point when the adjustment is delivered. The metacarpal bone of the small finger should also be placed so that it extends across the spine at right angles. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms are held in such a manner that they lie parallel to the spine but the left shoulder is dropped to a lower level than the right by the adjuster leaning somewhat toward the superior. Care should be taken to see that the arms in this position are equally bent. The elbows should be held well away from the adjuster's body and this is particularly important of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of the left hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is anterior and superior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the

Cut 137

Correct Position for Left Anterior Inferior Subluxation of Atlas

adjustment should be delivered taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Left Anterior Inferior Subluxation. In this subluxation, the adjuster must stand on the left side of the patient and he must see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient and with both legs resting against the patient's body. Palpation is then made with both hands. The left transverse process is located immediately behind the lobe of the left ear, by the second finger of the left hand. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found two-thirds of the distance from the spinous process of the axis and one-third of the distance from the left transverse process of the atlas. This point is also one-fourth of an inch below the line drawn between the tips of the two second fingers. The two second fingers are now carefully withdrawn leaving only the first finger indicating a spot on the neck which is to become the contact point.

The adjuster should now assume a standing position away from the patient's body but still inferior to the atlas. The left hand is now placed as the nail hand, using for the contact a point midway between nail point two and the pisiform bone. This eliminates the possibility of striking the jaw of the patient with the pisiform bone when the adjustment is delivered. The metacarpal bone of the small finger should be held at right angles to the spine of the patient. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient, in order to afford a firmer contact when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held in such a manner that they assume an easy, comfortable position and it will be found when this is done, that they extend obliquely across the spine of the patient. The arms should be equally bent and care should be taken to see that the elbows are held well away from the adjuster's body. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is anterior and inferior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, taking into consideration the changed position of the atlas, due to the turning of the patient's head.

Left Posterior Superior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he must see that the patient's face is turned toward the left.

If he is standing on the left side of the patient, he should first see that the patient's face is properly turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient, his left foot forward, facing his patient and with both legs resting against the body of the patient. Palpation is then made with both hands. The left transverse process of the atlas is located with the second finger of the left hand, immediately behind the lobe of the left ear. The bifurcation of the axis is located with the second finger of the right hand. The first and third fingers of both hands are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the

Cut 138

Correct Position for Left Posterior Superior Subluxation of Atlas With Adjuster Standing on the Left Side

tips of the two pointer fingers and one-fourth of an inch above the line drawn between them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the neck of the patient in order to afford a better contact when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms are permitted to assume an easy, comfortable position but the arms must be equally bent. The elbows should be held well away from the adjuster's body and this is particularly true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior and superior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed the adjustment is delivered, taking into consideration the changed position of the atlas due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient. he should first see that the patient's head is turned toward the left. He should then assume a standing position well inferior to the atlas, opposite the trunk of the patient with the left foot forward, his back to the patient and with both legs resting

Cut 139

Correct Position for Left Posterior Superior Subluxation of Atlas With Adjuster Standing on the Right Side

against the patient's body. Palpation is made with both hands. The left transverse process of the atlas is located immediately behind the lobe of the left ear by the second finger of the left hand. The bifurcation of the atlas is located by the second finger of the right hand. The first and third fingers are now carefully withdrawn, leaving only the two second fingers pointing to the right transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tips of the two second fingers and one-fourth of an inch above the line drawn between them. The two second fingers are now withdrawn, leaving only the first finger of the right hand pointing to a spot which is to become the contact point.

The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly on the patient's neck in order to afford a firmer contact when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 60° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone rests snugly in the groove formed by the arching of the nail hand. The shoulders and arms should be permitted to assume an easy, comfortable position; but the arms must be equally bent. Both elbows should be held well away from the body of the adjuster and this is particularly true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior and superior to the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered,

Cut 140

Correct Position for Left Posterior Inferior Subluxation of Atlas with Adjustor Standing on the Left Side

taking into consideration the changed position of the atlas due to the turning of the patient's head.

Left Posterior Inferior Subluxation. In this subluxation the adjuster may stand on either side of the patient, but he should see that the patient's face is turned toward the left.

If the adjuster is standing on the left side of the patient, his first consideration should be to see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas, his left foot forward, facing the patient and both legs resting against the patient's body. The palpation is made with both hands. The left transverse process of the atlas is located with the second finger of the left hand immediately behind the lobe of the left ear. The bifurcation of the axis is located by the second finger of the right hand. The first and third fingers are now withdrawn, leaving only the two second fingers pointing to the left transverse process of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tips of the two second fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now carefully withdrawn, leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand, using nail point two and seeing that the metacarpal bone of the small finger extends straight across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly upon the surface of the neck in order that a more solid contact may be afforded when the adjustment is delivered. The palm of the nail hand should be held in such a manner that it forms an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The arms and

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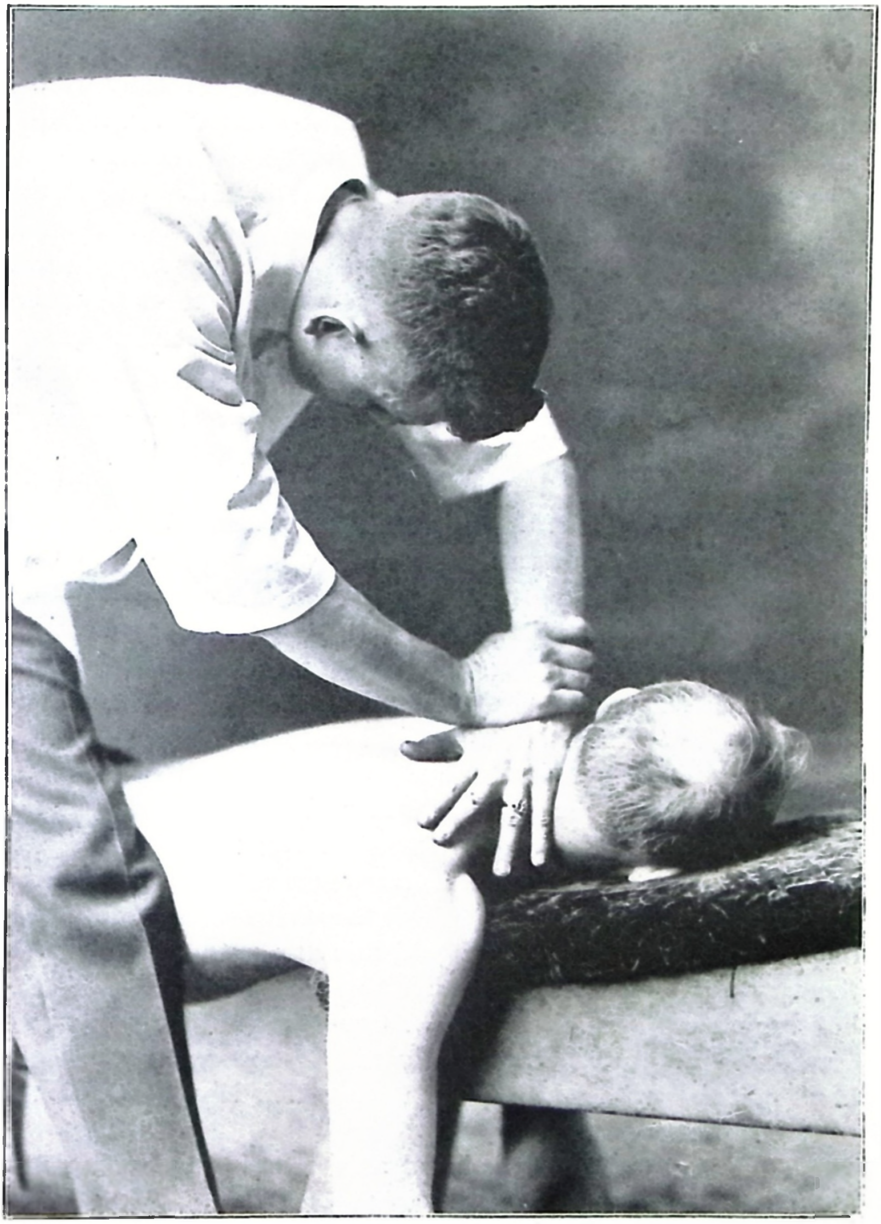

Correct Position for Left Posterior Inferior Subluxation of Atlas With Adjuster Standing on the Right Side

shoulders should be held in such a manner that they assume an easy, comfortable position, but the arms must be equally bent. Both elbows are held well away from the body of the adjuster and particularly is this true of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of that hand collapsing to the surface of the neck when the adjustment is delivered. The adjuster should lean in such a manner that the episternal notch is posterior and left of the line drawn through the two transverse processes. After seeing that the shoulders and arms are properly relaxed the adjustment is delivered taking into consideration the altered position of the atlas due to the turning of the patient's head.

If the adjuster is standing on the right side of the patient he should first see that the patient's face is turned toward the left. He should then assume a standing position well inferior to the atlas opposite the trunk of the patient, his left foot forward, his back to the patient and both legs resting against the patient's body. Palpation is then made with both hands. The left transverse process of the atlas is located with the second finger of the left hand immediately behind the lobe of the left ear. The bifurcation of the axis is located with the second finger of the right hand. The first and third fingers of both hands are now carefully withdrawn leaving only the two second fingers pointing to the left transverse of the atlas and the spinous process of the axis. With the first finger of the hand on the axis, a point is now found midway between the tip of the two pointer fingers and one-fourth of an inch below the line drawn between them. The two second fingers are now carefully withdrawn leaving only the first finger of the right hand pointing to a spot on the neck which is to become the contact point.

The left hand is now placed as the nail hand using nail point two and seeing that the metacarpal bone of the small finger extends across the spine at right angles. The fingers of the nail hand should be permitted to rest firmly on the pa-

tient's neck in order that a more adequate contact may be maintained while the adjustment is being delivered. The palm of the nail hand should form an angle of approximately 30° with the surface of the neck at the point of contact.

The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the depression formed by the arching of the nail hand. The shoulders and arms should be permitted to assume an easy comfortable position but the arms must be equally bent. Both elbows should be held well away from the adjuster's body and particularly is this important of the left elbow. By this method a rigidity is produced in the wrist of the nail hand which eliminates the possibility of its collapsing to the surface of the neck when the adjustment is delivered. The adjuster should now lean in such a manner that the episternal notch is posterior and inferior to the line drawn through the two transverse processes. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, taking into consideration the altered position of the atlas, due to the turning of the patient's head.

Posterior Subluxation. In this subluxation the same procedure is followed as in the right posterior and left posterior subluxations. The patient's face is turned toward the right and the adjustment is delivered following the technique of the right posterior subluxation. The patient's face is then turned to the left and the technique for a left posterior subluxation is followed.

Anterior Subluxation. In this subluxation the same procedure is followed as for a left anterior and a right anterior subluxation. The patient's face is first turned to the left and the adjustment is given using the same technique as for a left anterior subluxation. The face is then turned toward the right and the adjustment is given using the same technique as for a right anterior subluxation.

General Considerations for the Above Subluxations. It

should be distinctly remembered that the contact on the atlas is determined through a system of measurements instead of by direct palpation. The posterior ring of the atlas is the part where the force of the adjustment is delivered. If this could be palpated there would not be the necessity of complicating the system by first finding the transverse process of the atlas and the spinous process of the axis and then measuring to a point between them for the contact. It is very seldom that the posterior ring of the atlas can be felt beneath the first finger of the hand which palpates the axis nor can it be felt by the contact point of the nail hand when that is placed. Perhaps one of the most common errors is the tendency of the adjuster to try and feel the contact point with the nail hand and thus apply undue pressure to the patient's neck.

It will be noted that in the above subluxations those which showed superiority disclosed a contact point one-fourth of an inch above the line drawn between the spinous process of the axis and the transverse process of the atlas. By this method a point on the superior border of the posterior ring of the atlas is made the contact and thus when the force is delivered from the superior it is applied in such a manner as to attain the most effective results. It is also true that when inferiority is indicated by the subluxation the lower border of the atlas ring is located and the force delivered there. Where neither superiority nor inferiority is present the contact is made on the posterior border of the ring so that the force delivered here may be more effective.

SINGLE TRANSVERSE ADJUSTMENT FROM THIRD DORSAL TO TENTH DORSAL VERTEBRAE INCLUSIVE

The transverse adjustment should only be used from the third to the tenth dorsal vertebrae inclusive and then only in such cases as disclose a rotation. It should not be used above the third dorsal vertebra because the two upper dorsals are very firmly anchored and are so located that to get a proper

contact upon their transverse processes is a very difficult matter. The transverse adjustment should not be used on the eleventh or twelfth dorsal vertebrae for the reason that their transverse processes are only rudimentary and offer only a very inadequate contact for the nail point. Then too, the only advantage of using the transverse adjustment is in those cases where the tip of the spinous process is too far below the level of the body of the vertebra to offer a satisfactory leverage to reduce the rotation.

By a rotated vertebra, we mean a vertebra wherein the median line of the vertebral body is to the right or left of the tip of the spinous process. When this occurs, the transverse process on the side toward which the body is rotated is more posterior than its fellow on the opposite side. As a consequence, in a left rotation, the left transverse process becomes the contact point, while in a right rotation the right transverse process becomes the contact point.

It is sometimes extremely difficult to determine from palpation whether the vertebra is rotated or not. The spinograph, however, always discloses the true condition and its use is always advisable when the adjuster is not positive of the subluxation.

In a left rotation of any vertebra in the above region, the patient's face should be turned in the direction indicated by the rotation. The adjuster should assume a standing position opposite the vertebra in question, facing the patient and on the side opposite the direction indicated by the rotation. For instance, in a left rotation the patient's face should be turned toward the left and the adjuster should stand on the right side while in a right rotation the patient's face should be turned toward the right and the adjuster should stand on the left side.

Left Rotation. The adjuster should first see that the patient's face is turned toward the left. He should then assume a standing position opposite the vertebra in question, facing the patient and on the right side.

Palpation is made with the left hand and the spinous

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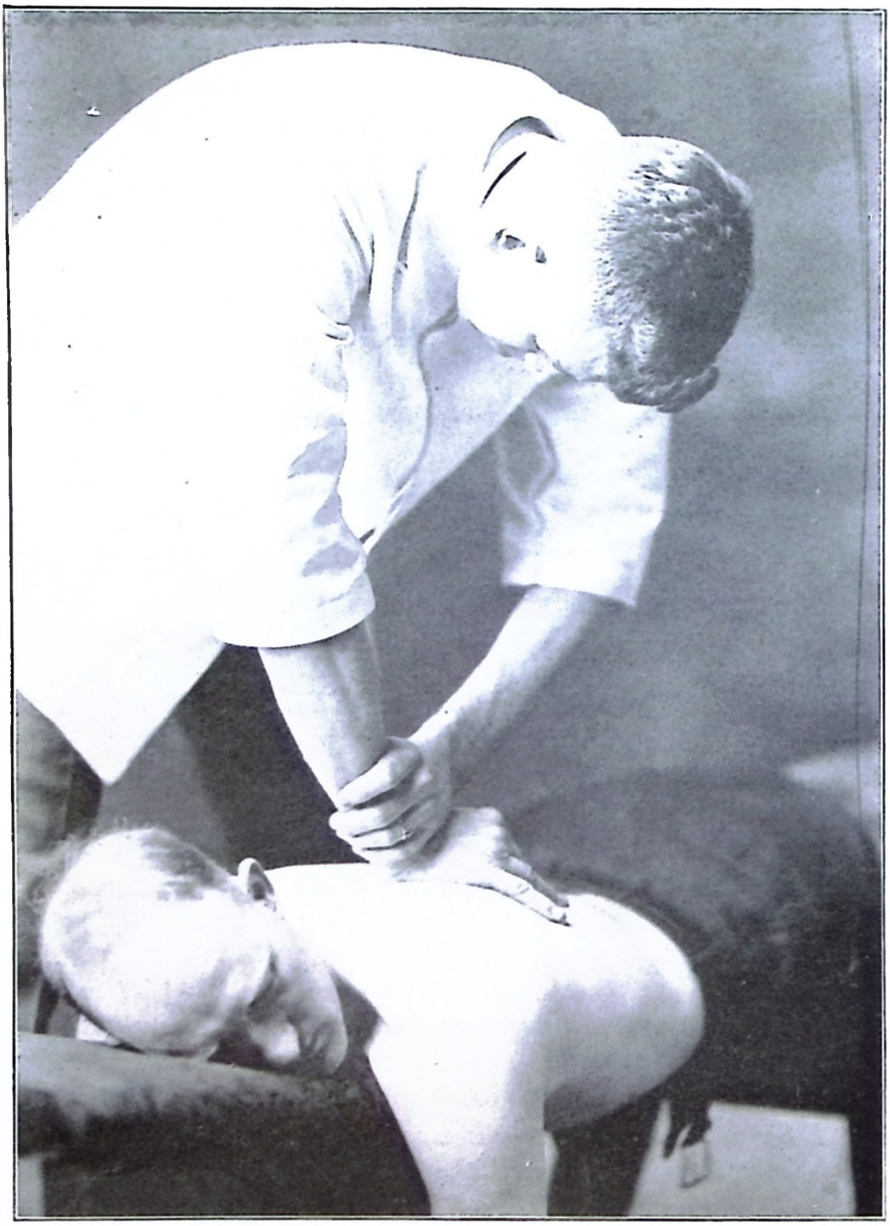

Correct Position for Adjusting a Left Rotation of Seventh Dorsal Vertebra

process of the vertebra in question is located with the second finger of the hand. The third finger is now removed and the first finger measures to the superior to a point on a level with the transverse processes of the vertebra. From this point the first finger is moved toward the left about one and one-fourth inches and there allowed to rest. The second finger of the palpating hand is now removed, leaving only the first finger pointing to the left transverse process of the vertebra. The right hand is now placed as the nail hand, using nail point one and seeing that the proper arch exists. The small finger of the nail hand should extend at right angles to the line of the spine.

The pointer finger of the left hand is now carefully withdrawn and the left hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be parallel to the line of the spine and the arms should be equally bent. The elbows should be held well away from the adjuster's body and after seeing that the shoulders and arms are thoroughly relaxed, the adjustment should be delivered, directing the force perpendicular to the back at the point of contact.

Right Rotation. The adjuster should first see that the patient's face is turned to the right. He should then assume a standing position on the left side of the patient, opposite the vertebra in question, and facing the patient. Palpation is made with the right hand and the spinous process of the vertebra in question is located with the second finger of that hand. The third finger is now removed and the first finger measures to the superior to the level of the transverse processes and then toward the right side about one and one-fourth inches. The second finger of the right hand is now withdrawn, leaving only the first finger of the right hand pointing to a right transverse process of the vertebra.

The left hand is now placed as the nail hand, seeing that the small finger extends at right angles to the line of the spine

Cut 143

Correct Position for Adjusting Right Rotation of Seventh Dorsal Vertebra

and with the hands properly arched. The first finger of the right hand is now carefully withdrawn and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms should be held parallel to the line of the spine and the arms should be equally bent. The elbows should be held well away from the body of the adjuster, and he should lean in such a manner that the episternal notch is perpendicular to the surface of the back at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered, directing the force in a line perpendicular to the surface of the back at the point of contact.

DOUBLE TRANSVERSE ADJUSTMENT FROM THIRD DORSAL TO TENTH DORSAL VERTEBRA, INCLUSIVE

The double transverse adjustment is used where the entire body of the vertebra is subluxated toward the posterior or where two adjacent vertebrae are rotated in opposite directions. In the double transverse adjustment both hands are used as nail hands at the same time.

Posterior Subluxation of One Vertebra. The patient's face should be turned away from the adjuster, but the adjuster may stand on either side of the patient.

Assuming that the adjuster is standing on the right side of the patient, the palpation is made with the left hand and the spinous process of the vertebra in question is located with the second finger. The first finger should measure to the superior to the level of the transverse processes and then toward the left approximately one and one-fourth inches. The first finger of the left hand is now exchanged for the pointer finger of the right hand. The first finger of the left hand then measures to a point approximately two and one-half inches to the right of the point held by the right hand. Everything

Cut 144

Correct Position for Double Transverse Adjustment of Seventh Dorsal Vertebra

is now removed except the two fingers pointing to the two transverse processes of the vertebra in question.

The adjuster assumes a standing position somewhat to the inferior of the vertebra in question and lowers the dorsal surface of the right hand to the patient's back in order to give him room for the placing of the left hand. The contact being held by the right hand, however, is not lost when the dorsum is lowered to the back of the patient. The contact which is being held by the pointer finger of the left hand is now momentarily lost and the pisiform bone of the left hand is lowered to the contact. Likewise, the contact being held by the right hand is momentarily lost and the pisiform bone of the right hand is lowered by that contact. The small fingers of each hand should be pointed directly away from the spine at an angle of 90°. The adjuster should lean in such a manner that the episternal notch is directly over the center of a line drawn between the two pisiform bones. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force in a line perpendicular to the back at the point of contact.

If the adjuster is standing on the left side of the patient, he should see that the patient's face is turned toward the right. He should then assume a standing position directly opposite the vertebra in question and facing his patient. The palpation is made with the right hand and the spinous process of the vertebra in question is located with the second finger of that hand. The third finger is now withdrawn and with the first finger a measurement is made toward the superior to the level of the transverse processes. From here the first finger is extended toward the right approximately one and one-fourth inches and the point thus found is then held by the pointer finger of the left hand. Measurement is now made from the point being held by the pointer finger of the left hand toward the left about two and one-half inches where a point is held, indicated by the pointer finger of the right hand. At this time there should be only two fingers in contact with the spine;

the pointer finger of the left hand indicating a spot on the right side of the spinous processes and the pointer finger of the right hand indicating a spot on the left side of the spinous processes.

The position of the left hand should now be altered in such a way that the contact may still be maintained by the second finger and yet permit the dorsum to be lowered to the surface of the back. The contact being held by the right hand, is now momentarily lost and the pisiform bone of the right hand permitted to drop to that point of contact. The same procedure is then followed with the left hand. Care should be taken to see that the small fingers of each hand point directly away from the spine at right angles. The adjuster should lean in such a manner that the episternal notch is perpendicular to a point midway between the two pisiform bones. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, directing the force straight from the perpendicular.

Adjacent Vertebra Rotated in Opposite Directions. For the sake of convenience in description, we will assume that the sixth dorsal vertebra is rotated toward the left while the seventh is rotated toward the right. It should, however, be distinctly understood that this same procedure would be followed, no matter which two vertebrae in the group were involved.

The patient's face should first be turned toward the left and the adjuster must stand on the right side of the patient. His standing position should be opposite the vertebra in question and facing his patient.

Palpation is made with the left hand and the spinous process of the sixth dorsal vertebra is located by the second finger. Keeping this finger in position, the first finger is now permitted to glide toward the superior until it reaches a point on a level with the two transverse processes of the sixth. From this point, it is permitted to glide toward the left about one and one-fourth inches, and thus it rests upon the tip of the left transverse process. The first finger of the left hand

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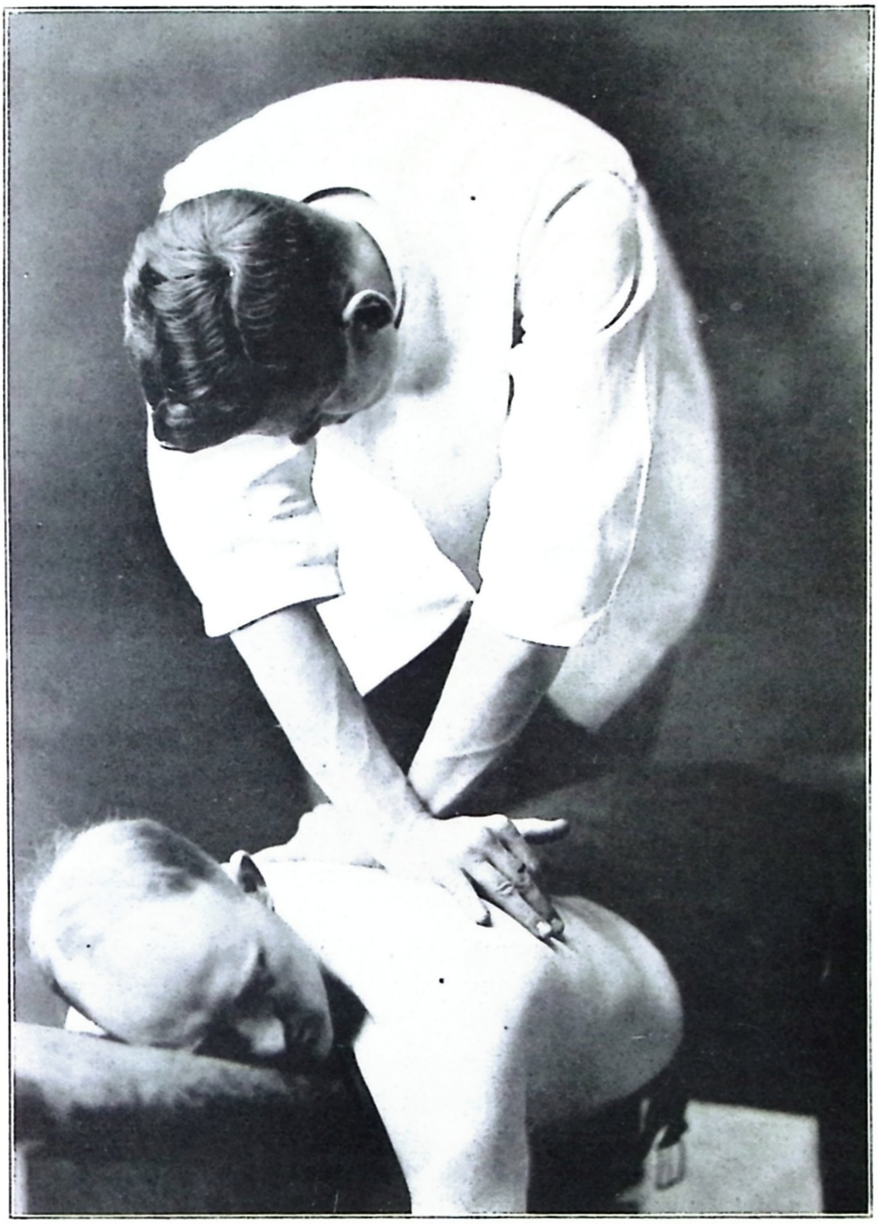

Correct Position for Double Transverse Adjustment on a Sixth Dorsal Vertebra Rotated Toward the Left and a Seventh Dorsal Vertebra Rotated Toward the Right

is now exchanged for the pointer finger of the right hand. The spinous process of the seventh dorsal vertebra is now located with the second finger of the left hand. Keeping this second finger in position, the first finger is permitted to glide toward the superior to a point in line with the two transverse processes of the seventh and from here toward the right about one and one-fourth inches. Here it locates the tip of the right transverse process of the seventh dorsal vertebra. All fingers should be withdrawn with the exception of the two fingers indicating the two transverse processes.

The adjuster should now step well to the inferior with the right foot forward and both legs resting against the patient's body. He should alter the position of the right hand in such a manner that plenty of room is left for the placing of the left hand. He should now momentarily lose the contact over the right transverse process of the seventh dorsal vertebra and drop the left hand to this contact. He should proceed the same with the right hand, after which he should be sure that both small fingers extend at right angles to the line of the spine. The shoulders and arms should be held at right angles to the spine and the adjuster should lean in such a manner that the episternal notch is perpendicular to a point midway between the two pisiform bones. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, directing the force perpendicular to the back at the points of contact.

In the following illustration we will assume that the sixth dorsal vertebra is rotated toward the right, while the seventh is rotated toward the left.

The adjuster should stand on the left side of the patient and he should see that the patient's face is turned toward the right. Palpation is made with the right hand and the spinous process of the sixth dorsal vertebra is located with the second finger of that hand. Leaving the second finger in contact, the first finger is permitted to glide toward the superior to a point on the level with the two transverse processes of the sixth.

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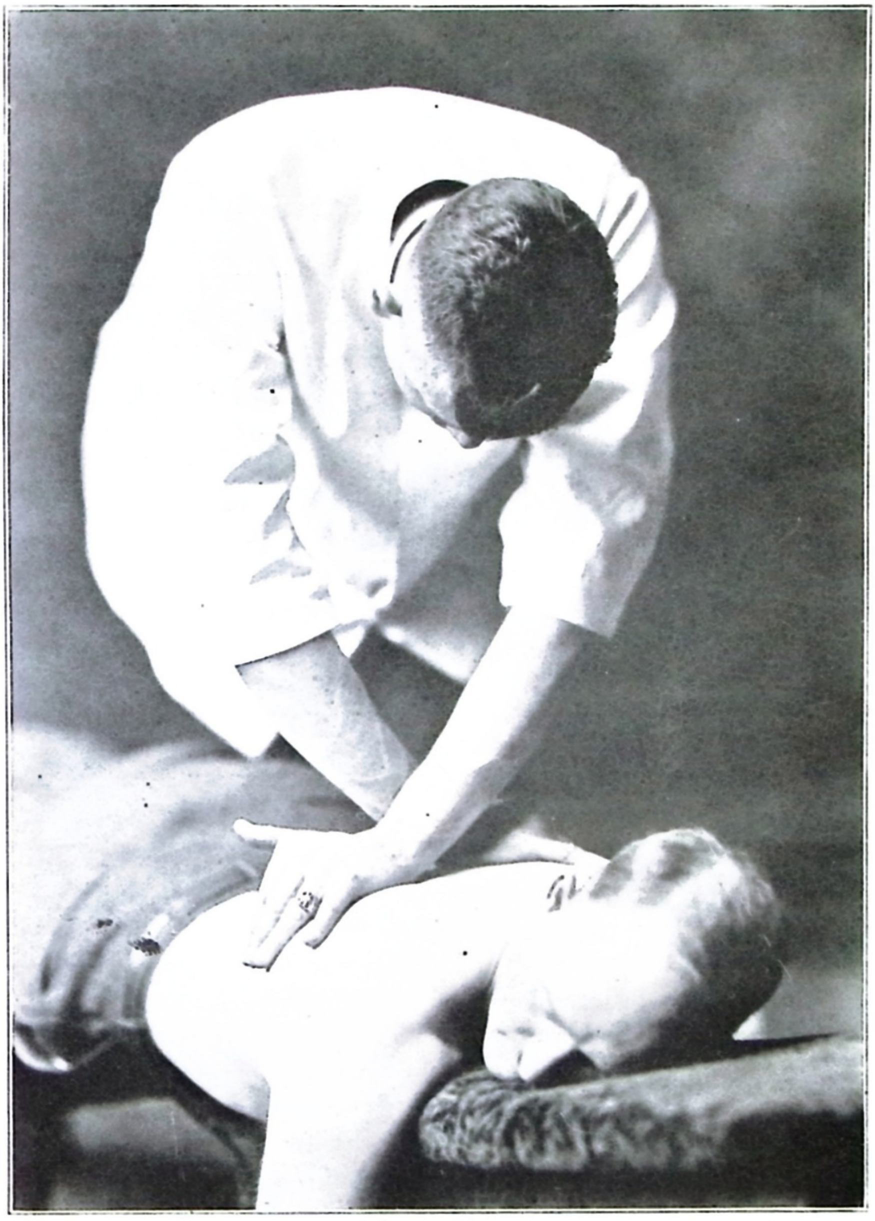

Correct Position for Adjusting a Sixth Dorsal Vertebra Rotated Toward the Right and a Seventh Dorsal Vertebra Rotated Toward the Left.

It should now be permitted to glide toward the right about one and one-fourth inches, thus locating a point directly over the tip of the right transverse process of the sixth. The first finger of the right hand is now exchanged for the pointer finger of the left hand.

The second finger of the right hand locates the spinous process of the seventh dorsal vertebra. While this contact is held by the second finger, the first finger is permitted to glide toward the superior to a point on the level with the transverse processes and then toward the left about one and one-fourth inches. Thus the left transverse process of the seventh dorsal vertebra is located. All fingers are now withdrawn with the exception of the two which indicate the right transverse process of the sixth and the left transverse process of the seventh.

The adjuster should now assume a standing position well inferior to the vertebrae with the left foot forward and with both legs resting against the patient's body. Keeping the pointer finger of the left hand in contact, this hand should be altered in position so that it leaves room for the placing of the right hand. The contact over the left transverse process of the seventh dorsal vertebra is now momentarily lost and the right hand is placed on that point of contact using nail point one. In the same manner, the left hand is placed on the right side of the spine. The small fingers of both hands should be extended at right angles to the spine and the shoulders and arms should also be held at right angles. The adjuster should lean in such a manner that the episternal notch is directly perpendicular to a point midway between the two pisiform bones. After seeing that the shoulders and arms are properly relaxed, the adjustment should be delivered, directing the force perpendicular to the back at the points of contact.

ADJUSTING ROTATION FROM ELEVENTH DORSAL TO FIFTH LUMBAR VERTEBRA, INCLUSIVE

In subluxations of this region which take the form of rotation the adjustment is delivered applying the same principle as used in the transverse adjustment of the dorsal vertebrae above described. Certain modifications are made, however, due to the variation of the structures of the vertebrae in this region. The double transverse adjustment is scarcely ever used in this region, but when it is employed the contacts are made on the mamillary processes of the lumbar vertebrae instead of on the transverse processes. Because of the double adjustment being so unusual in this region, we will not go into a detail description for its use. Suffice it to say that the same procedure is followed here as in the middle dorsal region, except that the contacts are made on the transverse processes of the eleventh and twelfth dorsal vertebrae and on the mamillary processes of the lumbar vertebrae.

Left Rotation. In this subluxation the adjuster should stand on the right side of the patient, facing his patient and opposite the vertebra in question. The patient's head may be turned in either direction.

The palpation is made with the left hand and the spinous process of the vertebra in question is located with the second finger of that hand. The first and third fingers are now removed, leaving only the second finger pointing to the spinous process of the vertebra in question. Keeping the second finger in position, measurement is made toward the superior with the first finger to a point between the spinous process which the second finger is holding and the one immediately above it. The first finger is now moved toward the left about one and one-half inches, thus indicating the left mamillary process of the rotated vertebra. The second finger is now removed, leaving only the first finger indicating the contact point. Nail point one of the right hand is now placed on the point of contact, care being taken to see that the first finger of the nail hand

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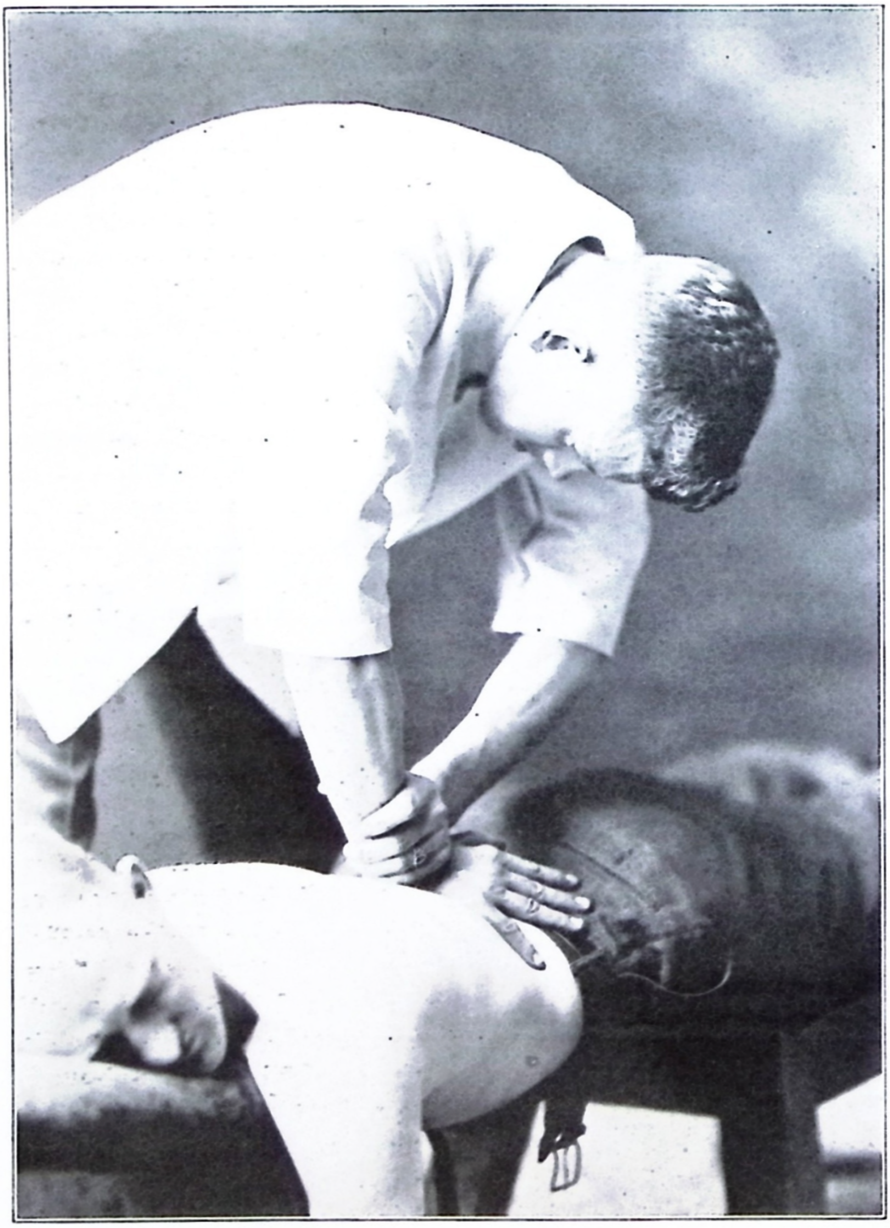

Correct Position for Adjusting a Left Rotation of a Second Lumbar Vertebra

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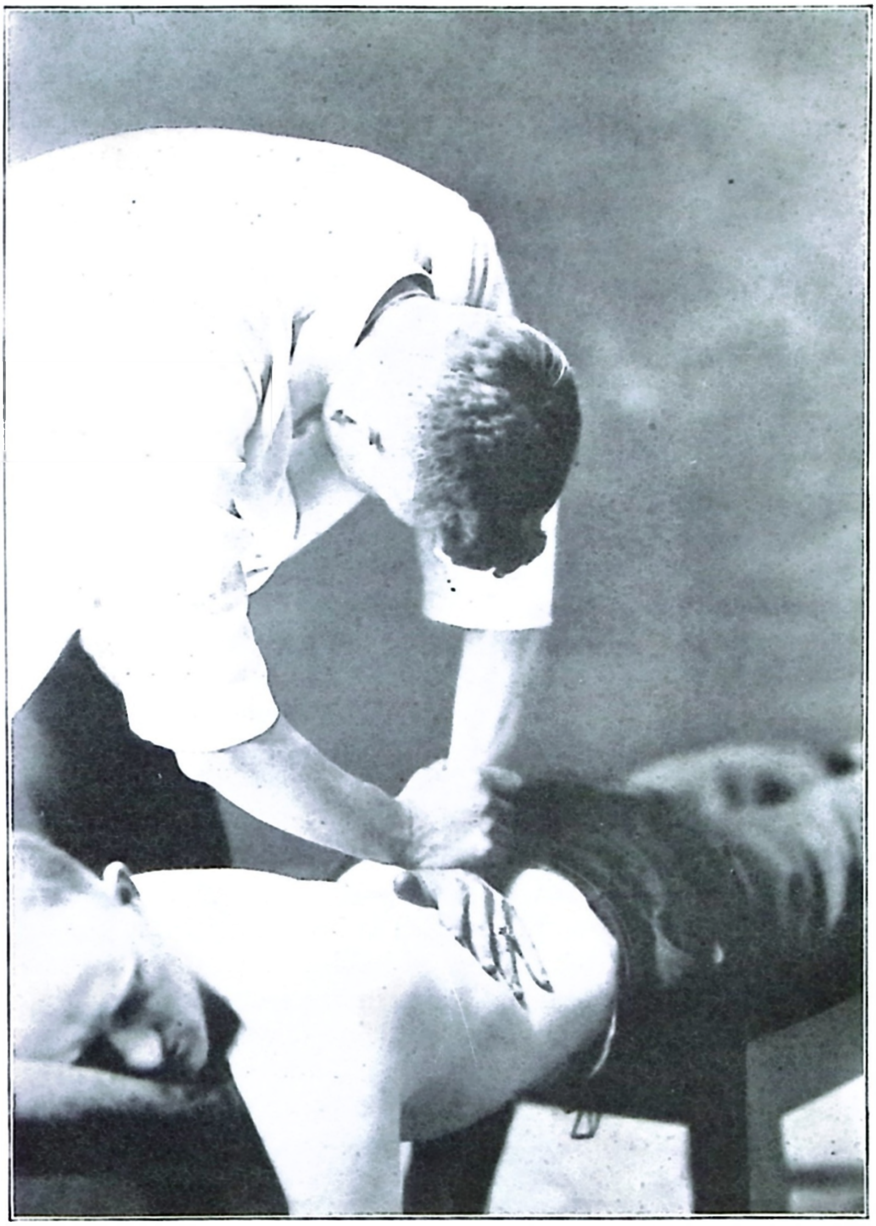

Correct Position for Adjusting a Left Rotation of a Fifth Lumbar Vertebra

extends outward to form an angle of approximately 90° with the line of the spine.

The first finger of the left hand should now be carefully removed and the left hand placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The shoulders and arms are held parallel to the line of the spine and the elbows should be held well away from the adjuster's body. The adjuster should lean in such a manner that the episternal notch is perpendicular to a line drawn to the surface of the back at the point of contact. After seeing that the shoulders and arms are properly relaxed, the adjustment is delivered, directing the force perpendicular to the back at the point of contact.

Because of the curve in the patient's back, it will sometimes be necessary to exchange the pointer fingers, thus allowing the left hand to become the nail hand and the right hand the hammer hand. This is only true of the fourth and fifth lumbar vertebrae and is determined by the altered curve of the spine at this point.

Right Rotation. In this subluxation the adjuster should stand on the left side of the patient, facing his patient and opposite the vertebra in question. The patient's head may be turned in either direction.

Palpation is made with the right hand and the spinous process of the vertebra in question is located with the second finger of that hand. The first and third fingers are now removed, using only the second finger in contact with the spinous process of the vertebra in question. Keeping this second finger in position, measurement is made with the first finger of the right hand toward the superior to a point midway between the spinous process held by the second finger and the one directly above it. This first finger is now moved toward the right approximately one-half an inch. The second finger is removed, leaving only the first finger pointing to the mamillary process of the right side of the vertebra in question.

Cut 149

Correct Position for Adjusting a Right Rotation of a Second Lumbar Vertebra

Nail point one of the left hand is now placed on the contact point, care being taken to see that the small finger extends away from the spine at an angle of approximately 90°. The first finger of the right hand is now removed and the right hand is placed as the hammer hand, care being taken to see that the pisiform bone fits snugly into the groove formed by the arching of the nail hand. The arms and shoulders of the adjuster should be held parallel to the line of the spine with both arms equally bent. The adjuster should lean in such a manner that the episternal notch is perpendicular to the back at the point of contact. After seeing that the arms and shoulders are properly relaxed, the adjustment is delivered, directing the force perpendicular to the back at the point of contact.

On the fourth and fifth lumbar vertebrae it may be necessary to exchange pointer fingers after the mamillary process has been located, thus permitting the right hand to become the nail hand and the left hand the hammer hand.

THE TOGGLE RECOIL ADJUSTMENT

The toggle recoil adjustment is one which has been developed only in recent years, and is a combination of the recoil adjustment with a toggled action of the arms. That is, when the elbows are brought together and the nail hand is forced downward, the adjuster's arms are twisted or turned at exactly the same instant. This gives rise not only to a downward direction of the force, but it alters in some measure the degree of laterality, superiority or inferiority during the adjustment.

The toggle adjustment is given only in three-lettered subluxations with the exception of the RA or LA atlas. Its purpose is to first bring the vertebra into lateral alignment with those immediately above and below it and then to eliminate the superiority or inferiority which is coexistent.

Posterior Right Superior Subluxation. The toggle may be used on any three-letter subluxation in any part of the

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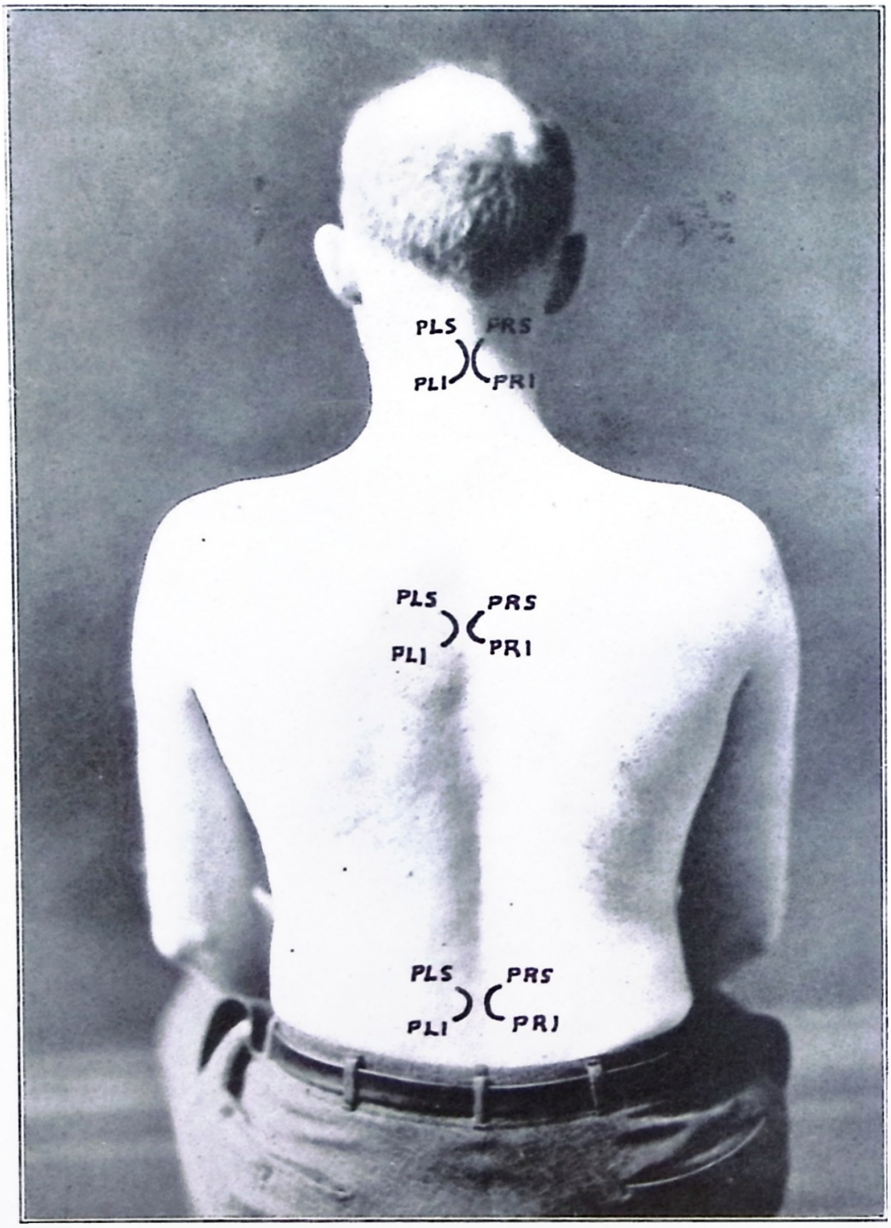
Correct Position for Adjusting a Right Rotation of the Fifth Lumbar Vertebra

Cut 151



Showing the Course Which the Nail Point Should Follow in Using the Toggle Recoil Adjustment in Cervical, Dorsal and Lumbar Regions

spine. The following is given to direct the adjuster as to the manner in which the toggle is delivered in a PRS subluxation of any vertebra he may be adjusting. He should first assume his position following the directions given for the various groups of vertebrae. He should lean as designated and the only alteration to be made is when the actual adjustment is delivered. At this time he should draw the left elbow sharply toward his body, throwing the right elbow away from his body. This movement, however, should not be exaggerated and the elbows should not be moved in these directions to exceed two inches.

Posterior Left Inferior Subluxation. In this subluxation the procedure should be followed as heretofore described up to the point when the actual adjustment is delivered. Then the right elbow should be thrust away from the adjuster's body and the left elbow drawn toward it, but neither should move in this direction more than two inches.

Posterior Right Inferior Subluxation. In this subluxation the adjuster should assume the same position as has been heretofore described, but when the adjustment is delivered he should draw the right elbow sharply toward him and thrust the left elbow from him. This movement, however, should not exceed two inches in either elbow.

Posterior Left Superior Subluxation. In this subluxation the position should be assumed in the same manner as has been heretofore described. When the actual adjustment is delivered, the adjuster should draw the right elbow sharply toward him and thrust the left elbow sharply from him.

A study of the foregoing will easily convince the adjuster that when the elbows are altered in the above manner while the adjustment is being delivered, the direction of force on the back will be applied more or less in a curved line, bringing the vertebra first toward the median line of the body and then restoring it from its superior or inferior position to a normal one.

One of the greatest errors in the delivering of the toggle recoil adjustment is in the fact that the elbows are toggled either just before or immediately after the recoil is delivered. It should on the reverse be executed at the same time that the recoil is delivered, thus gaining the full advantage of the change in the direction of drive during the delivery of the force.

Another common error lies in the adjuster exaggerating the degree of toggle, thus moving the elbows in a radius of five or six inches rather than confining it to a smaller radius. By doing this, too much of the attention is directed to the toggle and as a consequence, the recoil loses its effectiveness. Further, by such a wide radius the nail point is apt to be forced to lose its contact and the consequent error of slipping will be produced.

TOGGLE RECOIL ADJUSTMENT OF ATLAS

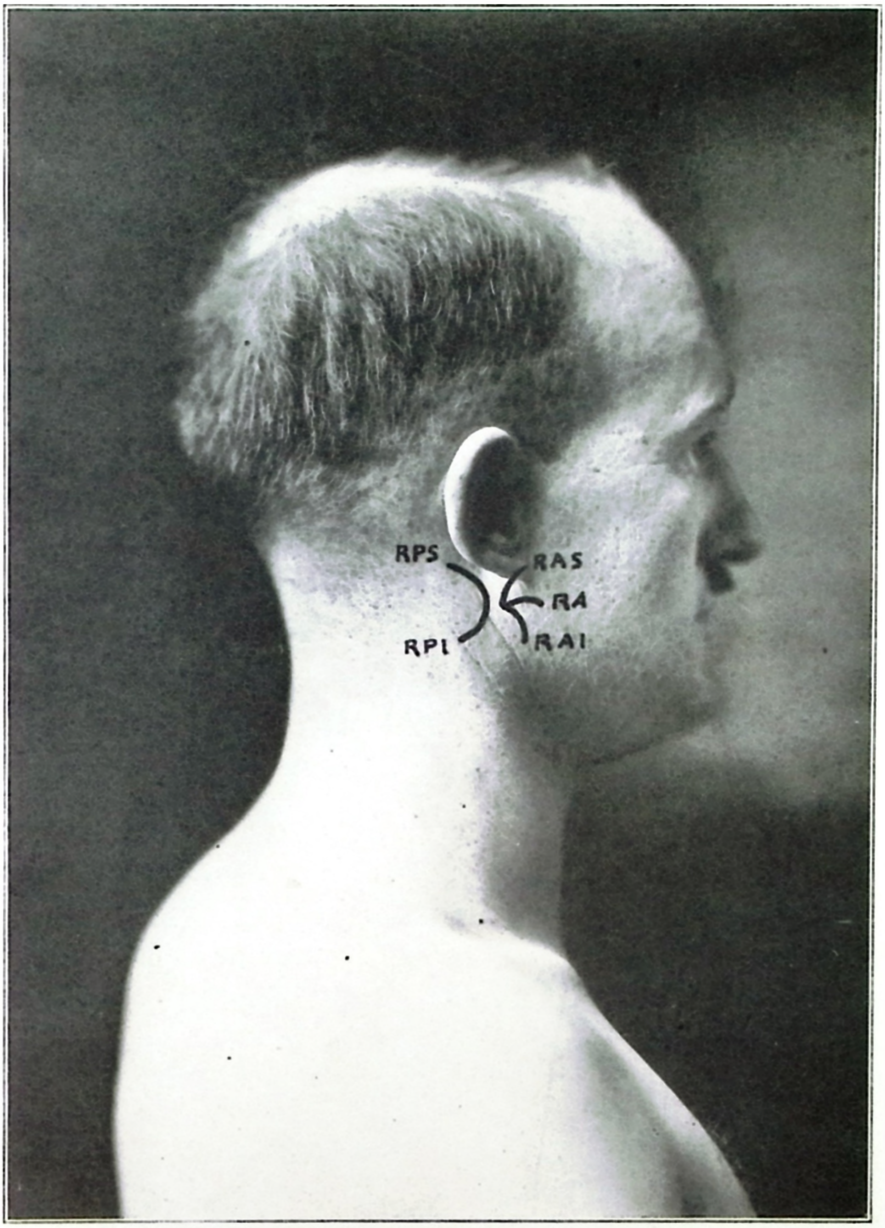
Right Anterior Subluxation. In this subluxation the adjuster should assume his standing and leaning position as has been heretofore described. When the adjustment is delivered, however, he should toggle the right elbow from him and the left elbow toward him, neither elbow, however, changing position in this direction to exceed two inches.

Right Anterior Superior Subluxation. In this subluxation the adjuster should assume the standing and leaning position as heretofore described, but when the adjustment is delivered, he should toggle the right elbow from him and the left elbow toward him, moving neither in this direction more than two inches.

Right Anterior Inferior Subluxation. In this subluxation the adjuster should assume the standing and leaning position as heretofore described, but when the adjustment is delivered, he should toggle the right elbow from him and the left elbow toward him, moving neither in this direction to exceed two inches.

Right Posterior Inferior Subluxation. In this subluxation

Cut 152



Showing the Direction Which the Nail Point Should Follow in Using the Toggle Adjustment on Right Subluxations of the Atlas.

Cut 153

Showing the Direction Which the Nail Point Should Follow in Using the Toggle Adjustment on Left Subluxations of the Atlas

the same position should be assumed as has been described, but when the adjustment is delivered the right elbow should be toggled away and the left elbow toggled toward the adjuster. Neither elbow should move its direction more than two inches.

Right Posterior Superior Subluxation. In this subluxation the adjuster assumes the same position as has been described, but he should toggle the right elbow toward him and the left elbow away from him. Neither elbow should move in these directions to exceed two inches.

Left Anterior Subluxation. In this subluxation the adjuster should assume the position as heretofore described, but when the adjustment is delivered, he should toggle the left elbow from him and the right elbow toward him. Neither elbow should move in these directions more than two inches.

Left Anterior Superior Subluxation. In this subluxation the adjuster should assume a position as heretofore described, but when the adjustment is delivered he should toggle the left elbow from him and the right elbow toward him. Neither elbow should be permitted to move in these directions more than two inches.

Left Anterior Inferior Subluxation. In this subluxation the adjuster should assume the position as heretofore described, but when the adjustment is delivered, he should toggle with the left elbow from him and the right elbow toward him. Neither elbow should be permitted to move in these directions more than two inches.

Left Posterior Inferior Subluxation. In this subluxation the adjuster should assume the standing and leaning position as heretofore described, but when the adjustment is delivered the left elbow should toggle from him and the right elbow toward him. Neither elbow should move in these directions more than two inches.

Left Posterior Superior Subluxation. In this subluxation the adjuster should assume the same position as heretofore described, but when the adjustment is delivered he should

toggle with the left elbow toward him and the right elbow from him. Neither elbow should move in these directions more than two inches.

Experience has taught that by toggling in these directions on the atlas it is more easily returned to its normal position. This is true because of the peculiar articulation between the atlas and the axis and between the axis and the occiput. A study of these articulating facets will disclose the fact that they are rather rocker shaped and it is for this reason that the toggle is such an advantage in the adjusting of this vertebra.

SECTION III.

NERVE TRACING

Nerve tracing is a mode of palpation used by the Chiropractor in following the course of tenderness along the path of a tender nerve or nerve fiber from its point of exit at the intervertebral foramen to its periphery where the incoördination is manifest; or it is a method of following that path from the periphery of the nerve or nerve fiber to its point of emission from the spinal cord through the intervertebral foramen.

To follow the course of such a nerve, it is necessary that there be pressure somewhere along its course otherwise no tenderness would obtain. Such a pressure ordinarily occurs at its point of exit thru the intervertebral foramen and is produced by the subluxation of one of the segments of the spinal column. The Chiropractor must not assume that the nerve can be detected or felt as a hard cord thru the tissues of the body and its course followed as resulting from the interpretation in the palpator's mind thru the sense of touch.

The tenderness which results, is pain produced by pressure and is, therefore, only temporary, existing only as long as pressure is brought to bear upon the tender nerve. When this pressure is removed the pain disappears. Pain is but a sensation perceived by the mind and is the result of interpretation of impressions arising from any abnormal condition anywhere in the body. It is that condition brought about by an abnormal internal or external vibration having a detrimental effect upon the body. From the above statements we reach the conclusion that tenderness can only exist when there is an abnormal condition in some part of the body; hence, since nerve tracing is a system of following the course of tenderness over the path of the nerves or nerve fibers, it can only be made when the necessary abnormal condition exists. It is absolutely

impossible, by this method, to follow the anatomical course of any nerve in the human body when it is in a normal condition and when no abnormality exists to make it otherwise.

THE BASIS OF NERVE TRACING

The first question that arises in the mind of the thoughtful student is regarding the condition which produces nerve tenderness. It is the purpose here to offer an explanation for this cause of tenderness, which is in accordance with the known facts of Physiology and Pathology and supported in Chiropractic as a result of wide clinical observation.

It is a fact that tenderness along the course of a nerve or nerve fiber can be traced from its exit at the intervertebral foramen or from the manifest incoördination at the periphery only when there is a vertebral subluxation producing pressure upon the nerve or nerve fiber preventing the normal flow of one hundred percent of mental impulses. The function of the nerve fiber is to carry the mental impulses from its origin or center in the brain to its periphery or ending in the tissue cell, or from the periphery to the center as the case may be. According to the best authorities on the subject of Physiology this function of carrying the mental impulses is manifested by a molecular activity along the course or path of the nerve fiber. If the nerve or nerve fiber is constricted or in any way interfered with at any point, anywhere along its course, this molecular activity is interfered with in proportion to the degree of pressure existing. If the activity referred to as molecular is in any way hindered, then the mental impulses cannot be properly transmitted from the center to the periphery or from the periphery to the center. Under this condition the nerve or nerve fiber cannot perform its normal function and like any other tissue does not perform the work assigned to it, the nerve would undergo a certain amount of depletion. This depletion or change in the structure of the nerve constitutes the abnormal condition from which the tenderness originates. It is this tenderness that makes it possible for the Chiroprac-

tor to follow the course of the nerve. The degree of change or depletion may be very infinitesimal, so slight that it is impossible for the observer to detect it even under the very highest power of the microscope or it may be a change to the extent that the comparison of a normal nerve with this one would show a marked difference. This change may involve only a single nerve fiber, it may involve an entire funiculus or bundle of fibers, in some cases the entire nerve trunk and yet in others the major portion of the entire nervous system. When a slight change obtains the incoördination resulting is localized and may be best illustrated by a typical case of neuralgia. If a number of fibers are affected by pressure in their course the incoördination is more diffused and will involve a greater periphery. Whereas, if the major portion of the nervous system is effected it may result in neurasthenia, which condition is defined as a nervous exhaustion characterized by a very general and diffuse tenderness.

VALUE OF NERVE TRACING

It should be the aim of every Chiropractor to make his analysis just as thorough and complete, and his adjustments as specific as possible. To make a thorough analysis it is necessary to go into the history of the case and ascertain whether any pre-existing condition might be discovered. It is necessary to know whether the condition may be one existing as a congenial deformity or whether it may have been caused by some accident following birth. It is well to obtain all the detailed information concerning the case and then by employing symptomatology, vertebral palpation and nerve tracing, to determine with the greatest degree of accuracy the cause of the existing incoördination. If the Chiropractor follows this course of reasoning, he is able to establish a direct and exact etiology in every particular case and does not depend upon his knowledge or someone else's conclusions reached in cases of a similar kind. For example: Many minor and acute incoördinations may not necessarily be indicated by any marked ver-

tebral subluxation and should the practitioner rely entirely upon symptomatology, vertebral palpation and the meric system he might be led astray owing to the irregularity that exists in nerve distribution in different individuals and hence to the organs or parts effected by such a nerve distribution. However, if he is fully aware of the history in each case and employs nerve tracing in each he will be able, by following the course of tenderness, to find the foramen at which the nerve is impinged and so discover the vertebra which is producing the pressure. Then by resorting to palpation of the vertebrae above and below this foramen, he is capable of detecting such a subluxation even though the displacement be very slight. If the vertebral palpation and the nerve tracing coincide in establishing a common cause of the incoördination and if the prevalent symptoms together with the history in the case point in the same direction, the practitioner is assured that he is proceeding in the correct manner even though the results obtained thru adjustments of the vertebra in question do not manifest themselves immediately.

One of the most impressive features of Chiropractic, particularly to the mind of the skeptical patient, is the process of nerve tracing. The well schooled and adept practitioner locates the point of exit of the tender nerve and follows the course of tenderness to the point where the incoördination is manifest, thus showing that he has located the cause and the effect and immediately obtains the confidence of the patient and impresses him with his capability. The chiropractor who uses this method finds it comparatively easy to convince the patient and to show him that the cause of the trouble lies in the spine and that chiropractic is the only rational method whereby this cause may be eliminated and the effect eradicated.

Nerve tracing is a method of palpation, or physical examination, used exclusively by the chiropractor and is only one of the many scientific features which differentiate chiropractic from all other known sciences.

The practitioner may find some cases in which no definite nerve tracing is possible; this, however, does not in any way lessen its value and can very easily be accounted for. It is sometimes difficult to make any definite nerve tracing upon a patient having general hyperasthesia, for the reason that all nerves and nerve fibers are tender, due to cord pressure resulting from an upper cervical subluxation. This would cause a general depletion of all the nerves in the entire peripheral system and since the nerve fibers are so minutely distributed, particularly to all cutaneous regions, crossing and recrossing, it would be impossible to follow definitely any one single path of tenderness. A subluxation obtaining elsewhere in the spine might also produce cord pressure and in this event the nerves from this point downward would be hypersensitive and could not be traced, while those above this point might not be so effected and their paths followed as in the ordinary case of nerve tracing. In some cases there is a condition of complete anesthesia in which case the nerves have undergone such a degree of degeneration and have been so transformed by an abnormal molecular activity that sensation in them has been entirely eliminated, hence there is no tenderness.

In degeneration of the spinal cord there is no definite nerve tracing for reason that the pathological condition or seat of incoördination lies within the neural canal and the nerves supplying the affected part are also enclosed and no pressure by the palpator can therefore be brought to bear upon them. A great many examples might be cited which would amply demonstrate the above fact. Cases of Infantile Paralysis, Tabes Dorsalis, Myelitis or any other similar condition, are the result of a cord pressure and cited only as a few of the examples.

The twelve pairs of cranial nerves are in a great measure enclosed within the cranial cavity and some of them are connected only thru their nuclei or deep branches with the spinal nerves that have their exit in the upper cervical region. No

pressure could be brought to bear upon those portions of the nerves so enclosed within the vault of the cranium.

A great many instances are found wherein the abnormality exists in the viscera of the thoracic, abdominal or pelvic cavities. These organs are so deeply placed that the internal divisions of the spinal nerves by which they are in part supplied, cannot be traced because the palpator cannot produce pressure upon these branches and hence is unable to follow the path of tenderness. The superficial branches are traceable as has often been demonstrated in the clinic and a great many illustrations are given in Vol. VI to show this fact. Chiropractors talk about the nerve tracings made in cases of heart trouble, stomach trouble, liver trouble, etc. and do not make it plain that there are both superficial and deep nerves supplying these parts and that only the superficial ones can be traced. The practitioner may know in his mind just what he means when he speaks of having made such a nerve tracing but to the patient or one who has not studied the human body to any extent, this would need further explanation.

The deep nerves supplying the heart are thirteen in number and are so placed that no pressure can be brought to bear upon them and thus no direct nerve tracing can be made of them. From clinical findings it has been thoroughly demonstrated that incoördinations of the heart are corrected by adjustment of the upper dorsal vertebrae, particularly the second, and hence it is only logical to conclude that the nerves supplying the heart emit from the spinal cord at this point. What course the deep nerves take from their point of exit to the organ which they supply is not so important and all that the Chiropractor is particularly interested in is to know which vertebra should be adjusted to affect a coördination. Tender nerves may be traced from the intervertebral foramina superior or inferior to the second dorsal vertebra on the left side of the spine. The paths of these nerves may be followed from their point of exit at the intervertebral foramina along the intercostal spaces to the left, thru the left axilla to a region directly

over the heart. These nerves, as before stated, are the superficial ones and whether they are efferent and the deep ones the afferent or vice versa, cannot be definitely stated. If it is possible to trace the superficial nerves by their paths of tenderness, we would conclude that the deep nerve fibers emitting thru the same openings would also be impinged. These latter nerve fibers are the deep branches which supply the heart and hence the reason why occasionally incoördinations of the organ may exist when no nerve tracing is possible.

The liver is supplied by nerves having their exit in the region of the fourth and fifth dorsal vertebrae, which is commonly known as liver place. The deep nerves pass from here to the peripheral ganglionated cord, then thru the Splanchnic nerves to the solar plexus and from the solar plexus to the hepatic. These deep nerves are so situated that no pressure by palpation can be brought to bear upon them and therefore they cannot be traced. However it is common knowledge among Chiropractors that nerve tracings have been made and are daily being made in cases of liver trouble. A number of cuts in Vol. VI clearly show such tracings. The nerves that are traceable and the ones that the layman might suppose are alone the cause of the incoördination emit from the foramina at liver place and their course may be followed by points of pressure thru the fourth or fifth intercostal spaces on the right and left of the spine around the body to the anterior and branching in the cutaneous structures and superficial muscles over the region of the liver. Particularly is this true of the nerves from the right side of the spine, for in a great many instances the nerves from the left have been traced and found to end on the left of the anterior median line or else could not be traced at all. In the study of anatomy this fact is borne out and it is found that the intercostal nerves that emit on the right side of the spine end to the right of the anterior median line and those emitting from the left side of the spine terminate in the tissue to the left of the anterior median line.

The stomach is supplied by deep and superficial branches

of spinal nerves. The deep nerves make their exits from the intervertebral foramina on the right and left of the spine between the fifth and sixth, the sixth and seventh and the seventh and eighth dorsal vertebrae. Anatomically these nerve fibers pass from the spinal nerves into the peripheral ganglionated cord thence thru the Splanchnic nerves into the solar plexus and from the solar plexus to the gastric plexus. These deep nerves are not traceable but may nevertheless contribute to any existing incoördination present in the stomach. The Chiropractor traces superficial nerves from their point of exit at stomach place to the right and left of the spinal column around the body thru the intercostal spaces to the superficial tissues at the anterior over the region of the stomach. He might conclude that these nerves are the only ones which are producing the existing incoördination, but has omitted the fact that the deep nerves, as before stated, might also contribute to the trouble. The information gained by this existing tenderness proves the contention that there must be a subluxation and the conclusion then reached is that if the superficial nerve is tender, its deep fellow which also supplies the stomach and has its origin through the same intervertebral foramen must, of necessity, be impinged.

The above three cases citing the conditions concerning the heart, the liver and the stomach are given only as examples of many other similar tracings of deep nerves that might be made if it were possible to follow the nerve fibers leading to other deeply situated organs in the human body.

In some instances the subluxation producing pressure upon the superficial nerve may be of such a degree and the vertebra may be in such a position that the deep nerves emitting thru the same opening might in no way be interfered with. For example: there might be an incoördination obtaining in the abdominal muscles supplied by superficial nerves having their exit from the spine in the region of the ninth or tenth dorsal vertebra and yet from all the symptoms that might be gleaned in the case no splenic or suparenal gland trouble is found to

exist, thus demonstrating the fact that the deep nerves are in a normal condition.

In a preceding paragraph we have discussed the condition of neurasthenia that is often present in cases where subluxations produce a cord impingement. There are known cases that have come under the observation of different practitioners where a diffuse tenderness has been found in some region of the body preventing the possibility of a nerve tracing being made in that region and yet thru the adjustment of a vertebra in that region, apparently only slightly subluxated, coördination has been restored and the hyperasthesia in the region completely eradicated. From the above reasoning we would conclude that the nerves of this region have suffered a certain amount of depletion due to the inability of the proper flow of mental impulses.

Other cases have been noted where a condition of neurasthenia has existed temporarily and apparently no one subluxation or a combination of subluxations has been found to exist as the causative factor. Take, for example, an individual apparently in the best state of health, who has for many days concentrated all his force along certain lines of mental or brain work. He may at the end of such time have developed an extreme sensitiveness over the entire surface of the body. In such a case as this all of the mental impulses are being used and even though no pressure upon nerves exists there is not the normal flow and the nerve suffers a change or depletion. After a time, when the forces are no longer concentrated along the lines of mental work, a sufficient amount of mental impulses begin to flow thru the nerve fibers so that the depletion is corrected and the hyperasthesia disappears.

Certain nerve tracings in the human body are superficial and others if it were possible to make them might be known as deep. Those which are deep are best exemplified by the discussions concerning the anatomical tracing of nerves made to the heart, the stomach, and the liver in which cases the superficial nerves are traceable and the deep ones are not, yet

both sets lead to the seat of the incoördination and are responsible for the trouble. Superficial nerve tracings which might be known otherwise as specific tracings, are such wherein the tender nerve can easily be traced from its point of exit to the seat of the incoördination or from the seat of incoördination to the center. One example of such a tracing as this has been cited in connection with the tracing made of the ninth and tenth superficial dorsal nerves to incoördinations of abdominal muscles. Other examples of superficial tracings will be given in later pages and many are pictured in Vol. VI.

It is not possible to always elicit tenderness in the region of apparent subluxations for reason that the nerve itself might not be impinged. That which appears to be a subluxation may only be an elongated spinous process, or it may be a bent or distorted spinous process, or there might be a growth or an exostosis making it appear upon palpation as though the vertebra was subluxated. The practitioner, in cases of this sort would be unable to tell by palpation just what the existing peculiarity might be and in all cases of this kind the best and only proof would be an X-Ray picture. In some instances there may be a subluxation and yet no tenderness is traceable. This can be accounted for by the existance of a large intervertebral foramen, so that the subluxation would not sufficiently decrease this opening to produce any degree of pressure upon the nerve making its exit there.

SUGGESTIONS FOR TRACING TENDER NERVES

In the making of a nerve tracing the first essential is that the patient be properly prepared, as in vertebral palpation and seated upon the palpation stool. The practitioner should then obtain all of the symptoms existing in the case, both objective and subjective and then by a proper grouping of these symptoms he should determine in his own mind the location of the existing abnormality. By his knowledge of the spine and the meric system he is then able to locate that vertebra in the spine which is the cause of the incoördination. Bearing this

fact in mind, he next makes a thorough palpation by the rules laid down concerning that particular subject. After recording such subluxations he is then able to locate the point of exit of the tender nerve and then follow its course to the periphery, locating the region where the incoördination is manifest. In many instances it is much better to try to locate, from the symptoms in the case, the effected region and palpate to find an existing tenderness. Upon finding this, follow the tender nerve over its course from the periphery to the center which will be its point of origin in the spine. No preference can be assigned to either method, as it is true that in some instances one might err in properly locating the tender periphery from the symptoms and in other cases error might arise in having chosen the improper subluxation as the causative factor of those symptoms. The method of tracing tender nerves will be hereinafter described under the technique of nerve tracing.

The Chiropractor should be thoroughly acquainted with the meric system and also make it a point to study the subject of neurology and then to compare his findings and reach better and more definite conclusions. He should apply himself diligently and carefully to a study of the science of chiropractic as presented by The Science of Chiropractic Library Series in Vol. 6.

A great many Chiropractors have the idea that the nerve tracings as described in Vol. VI and the rules laid down in the meric system do not agree with the anatomical distribution of nerves, but from the study of these subjects and a careful comparison, they will learn that although there are differences, yet in main the two are a very close parallel. This slight discrepancy is bound to exist and can be explained on the ground that in the study of anatomy the various nerves, in different bodies that have been traced go to show that out of one hundred cases under observation and study, only two were found wherein the distribution of nerves was exactly the same.

Cut 154

Correct Position for Fingers of Tracing Hand

TECHNIQUE OF NERVE TRACING

In making a nerve tracing, either hand may be used as the palpating hand. The palpation is made with the tip of the second finger braced at its first joint on the palmar side by the ball of the thumb and on its dorsal or posterior side by the first finger. The other two fingers are flexed so as to rest comfortably in the palm of the hand. When this position of the hand is correctly assumed, then we are enabled to apply pressure along the course of the nerve to be traced with only one point of contact, which is the tip of the second finger.

The patient who is properly prepared for nerve tracing should not have more than one thin garment covering that part of the body where the tracing is to be made and when practical, we have the part being nerve traced entirely exposed. The patient is then placed in such a position that the palpator may conveniently get at the part where the nerve tracing is to be made. The position of the palpator or tracer is defined as the one which is the most comfortable or convenient in which the tracing may be made and this position changes from time to time as the tracing progresses, thus facilitating its procedure. The tracing may be started by beginning at the periphery of the impinged nerve or nerve fiber or directly over the organ effected. Again it may be altered, and is better in some cases, to begin at the exit of the nerve or nerve fibre which is at the intervertebral foramen to the right or left, above or below the subluxated vertebra producing such an impingement. The hand is placed in position as previously described and pressure is then made with the tip of the second finger over the area beneath which the tender nerve is supposed to lie. If tenderness is not elicited by pressure at the first point, the finger, without being raised from its point of contact, should be slowly moved from side to side at right angles to the course of the suspected nerve. Should this method of procedure give rise to no undue tenderness the pressure should be gradually increased and the amplitude of the movement of the finger lengthened until a reasonable distance has been

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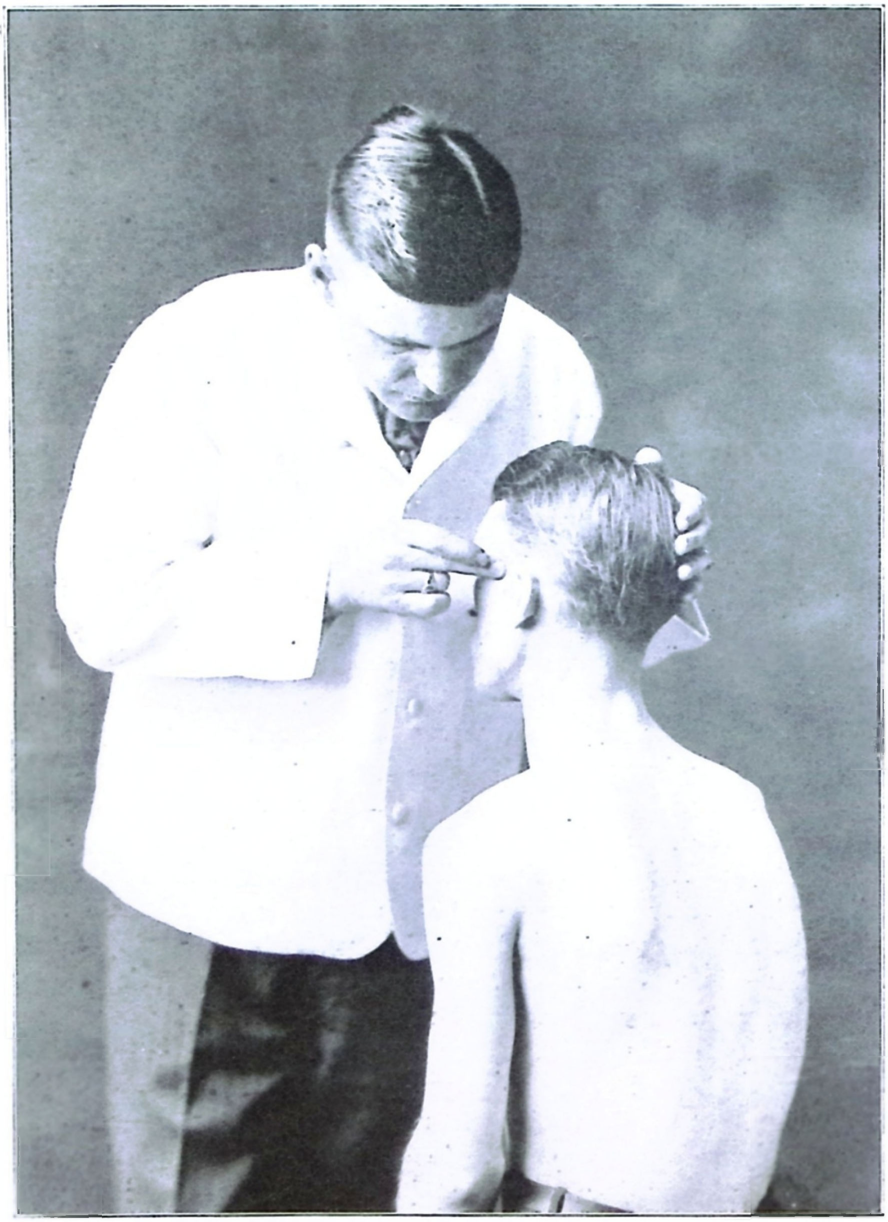
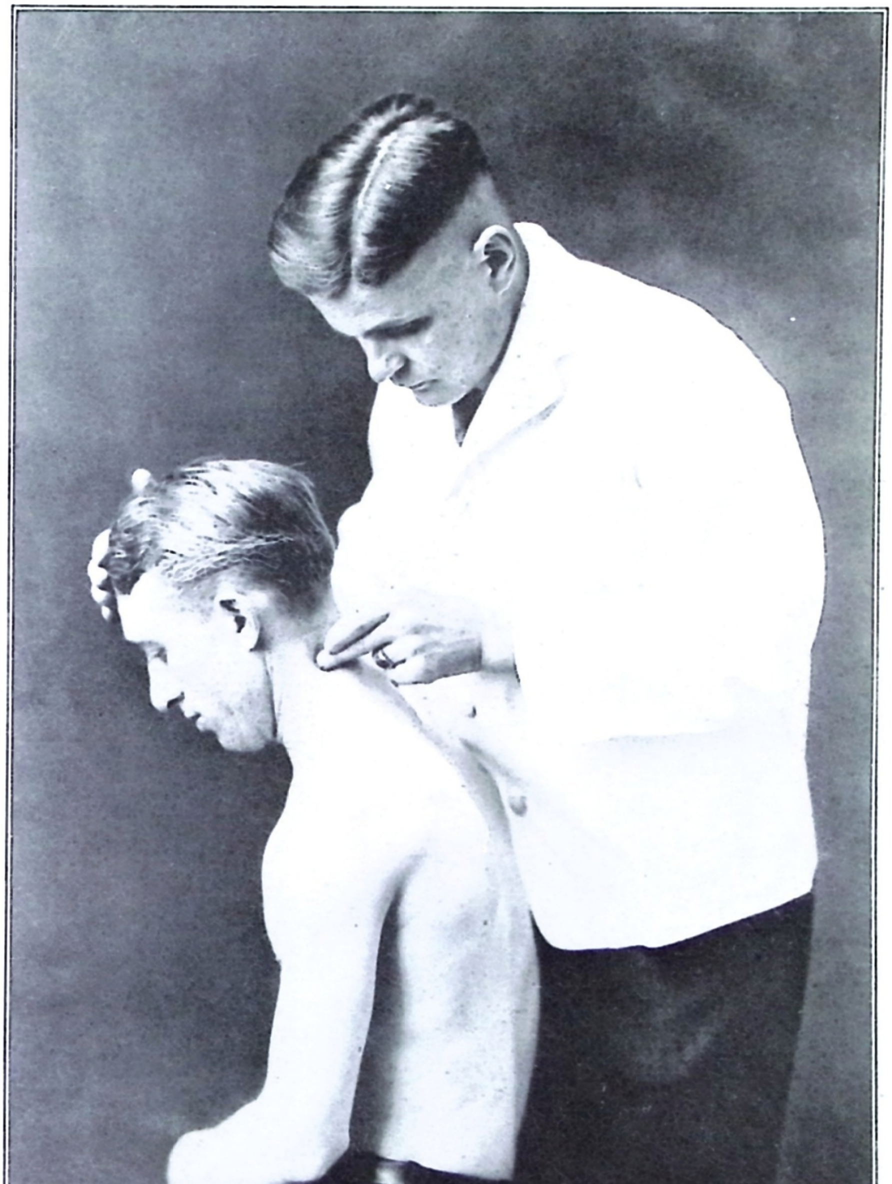


Showing the Position of Patient and Palpator in Making Nerve Tracing on Head

Cut 156

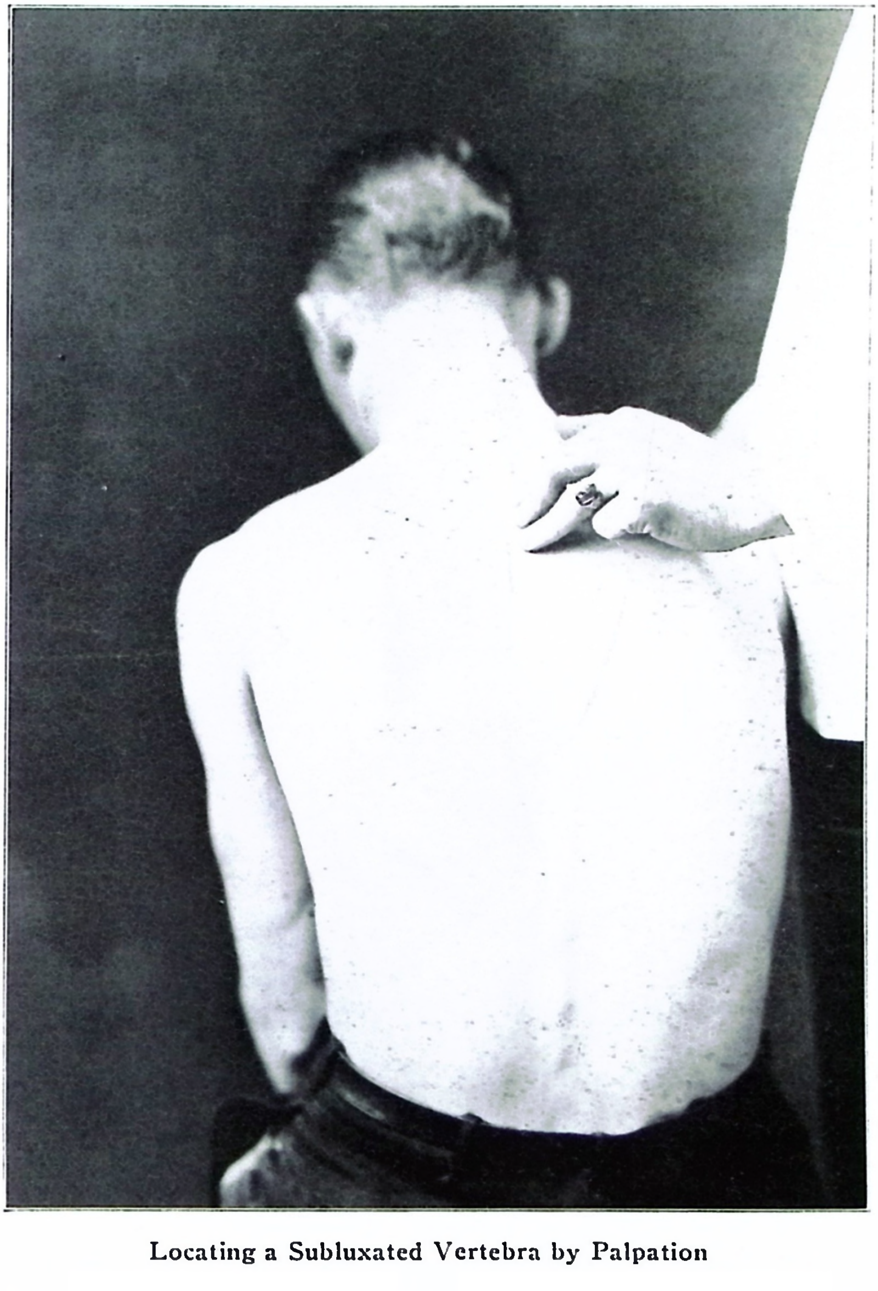


Position of Patient and Palpator When Tracing Nerves Over the Neck

Cut 157

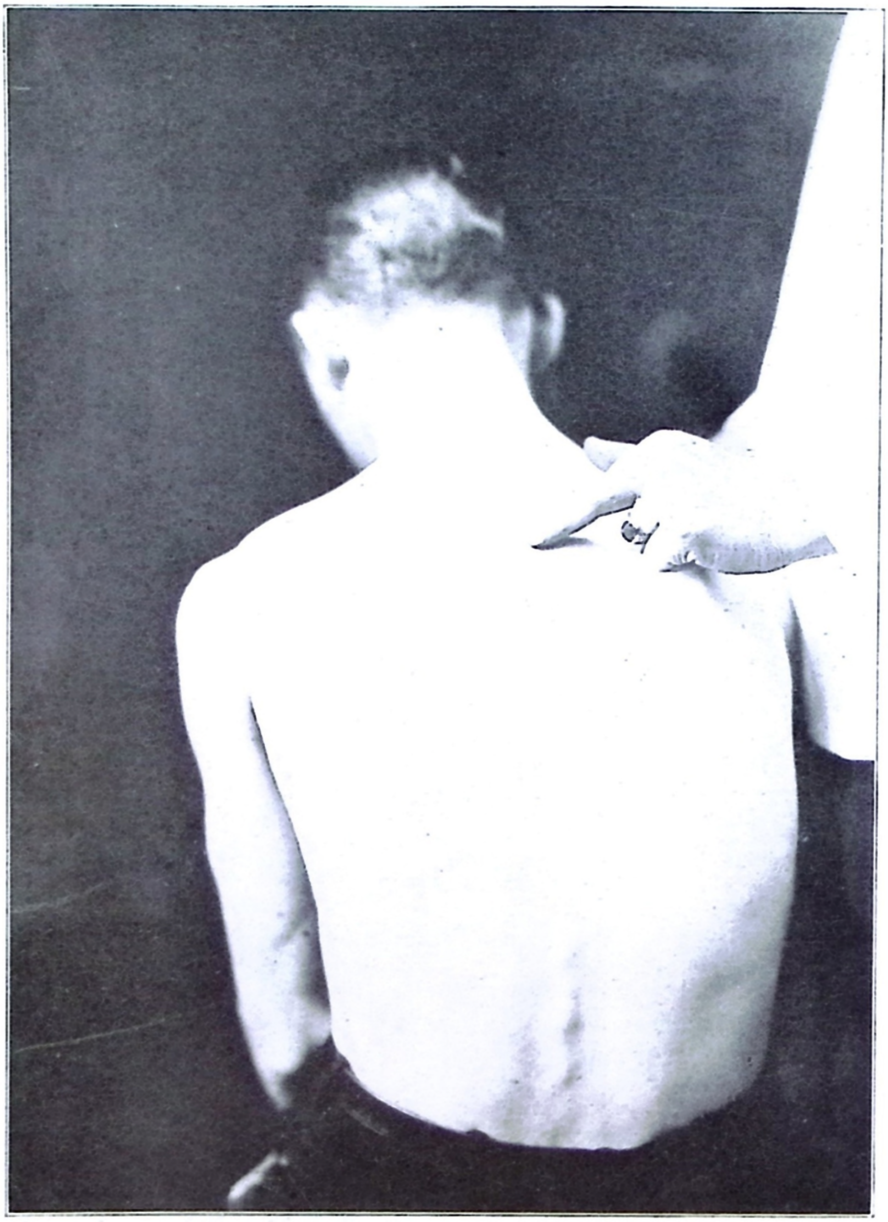
Position of Patient and Palpator When Making Tracing in the Dorsal Region

Cut 158



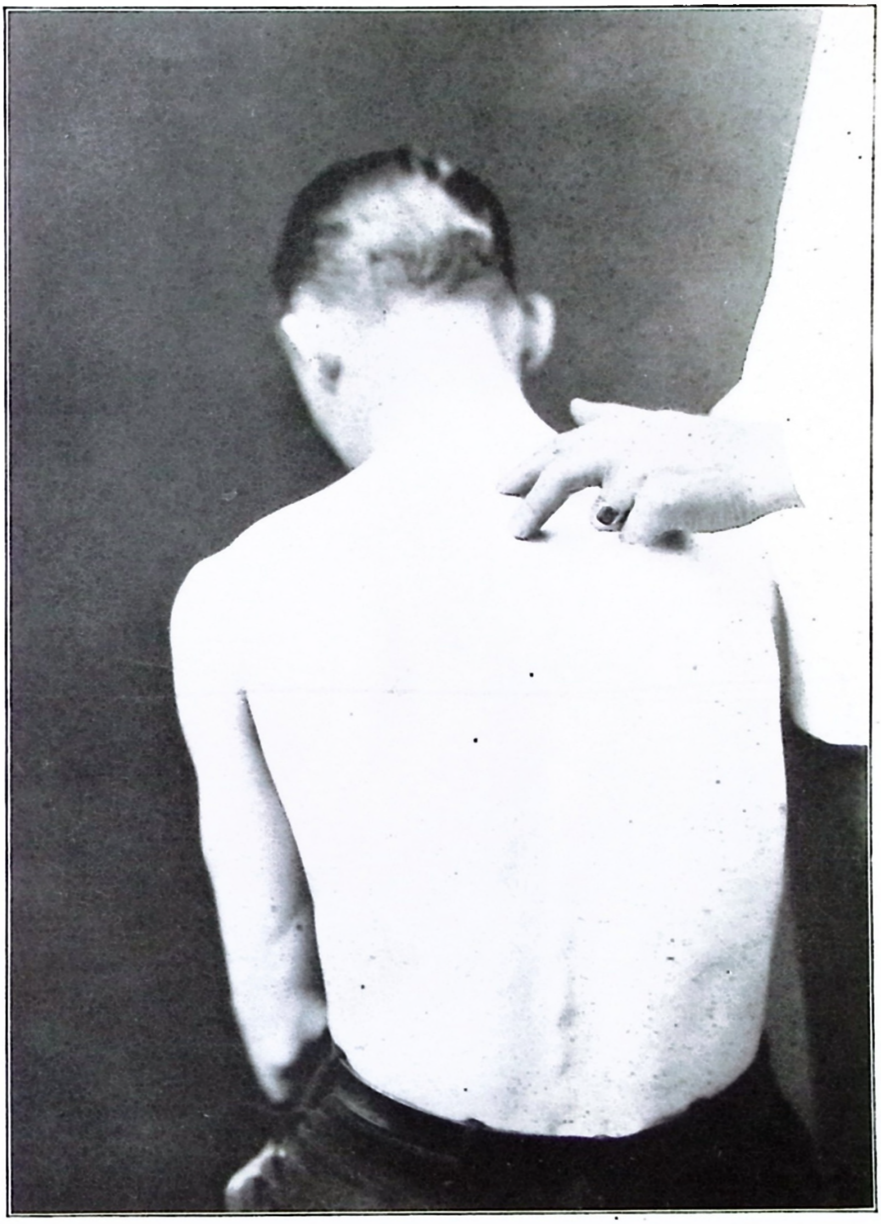
Locating a Subluxated Vertebra by Palpation

Cut 159



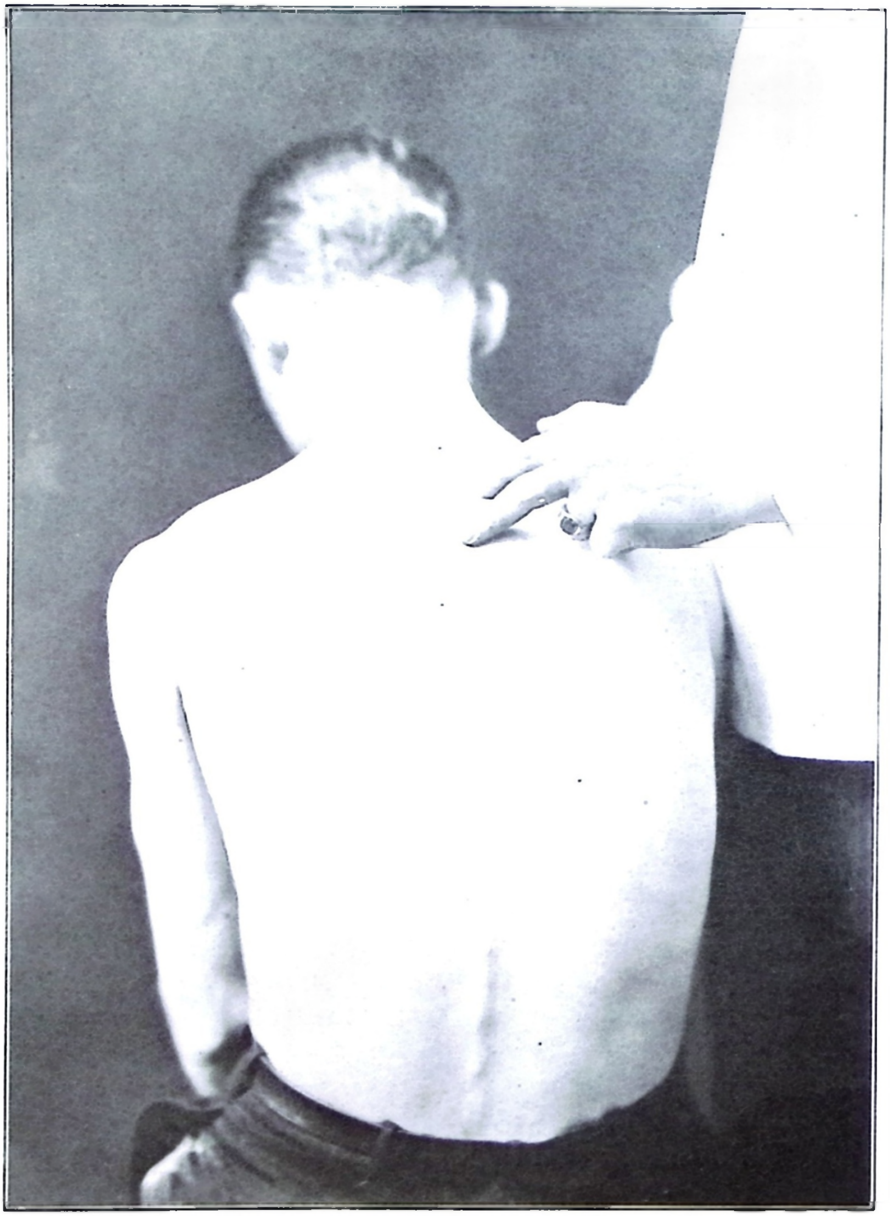
Marking the Spinous Process of the Subluxated Vertebra by the Chiropractor's Index Finger

Cut 160



Tracing Upward with the Index Finger to the Level of the Exit of the Superior Pair of Nerves

Cut 161



Tracing With Index Finger to Right Marking the Exit of the Right Superior Nerve

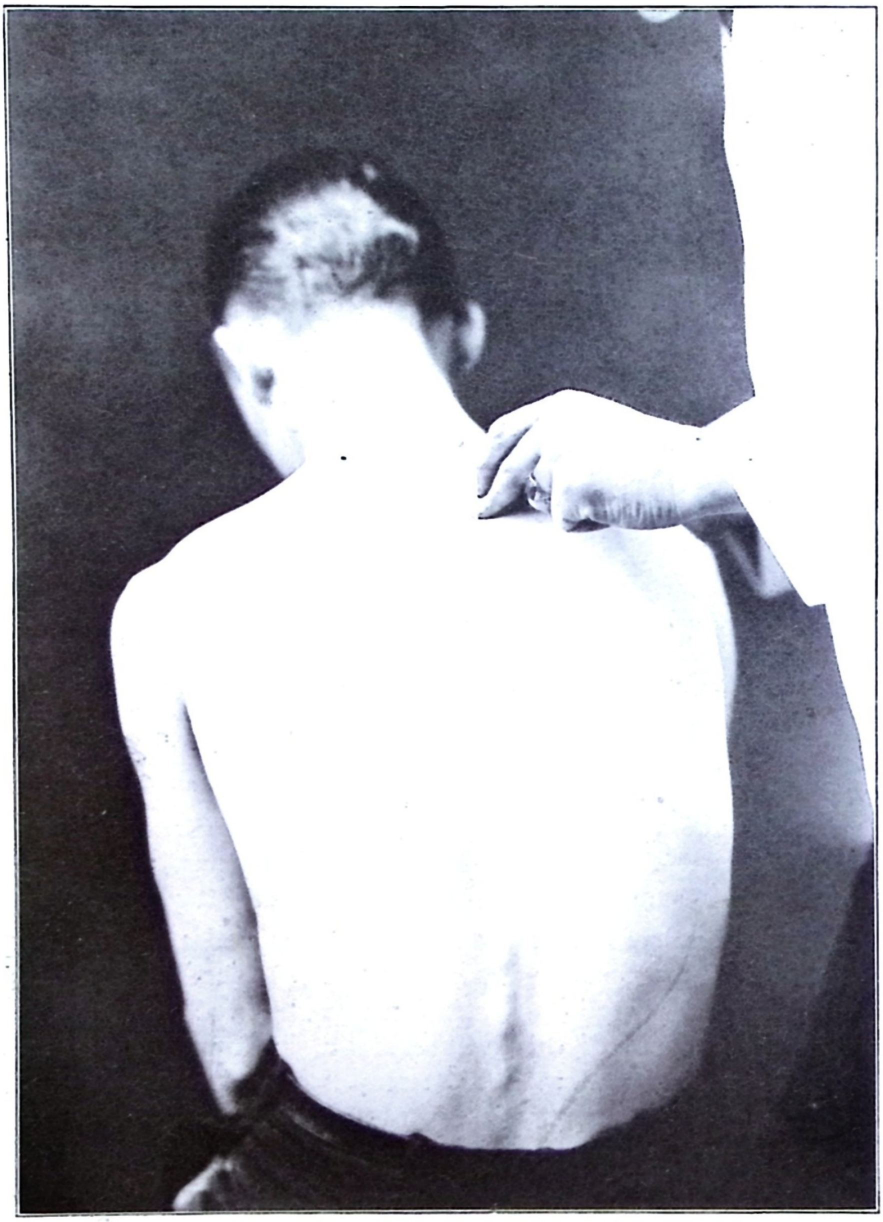
covered and a proper degree of pressure employed. If no tenderness is then found at the point of increased pressure the finger is then moved to a second point of contact slightly above the first and the same method of procedure as before is again followed. If the second point of contact does not give rise to any tenderness the position of the palpating finger is then changed to a point below the first contact and again the same method ensues. This action is continued until a point of tenderness is located.

Having located the first point of tenderness by the method above described, the point of contact is then moved about one half an inch distant from the original point of pressure in a direction along the supposed course of the tender nerve. If the palpator possesses a good knowledge of the nervous system as anatomically described and knows what paths the nerve fibers, particularly the superficial ones follow, he is enabled to make a tracing more accurately and more readily. Should the palpator fail to detect tenderness at the second point of contact he should then give careful attention to the area on either side and continue to widen his scope of examination until the second point of tenderness is located. The process of tracing the entire course of a tender nerve from the periphery to the center or vice versa consists in a repetition of the procedure above described until the spinal origin or the periphery where the incoördination is manifest, is finally and exactly located.

Certain nerve fibers that are being traced are found to pass beneath osseous structures and these should again be picked up at their point of emission therefrom. The very best examples of cases of this nature are to be found where the nerve fibers pass underneath the scapulae.

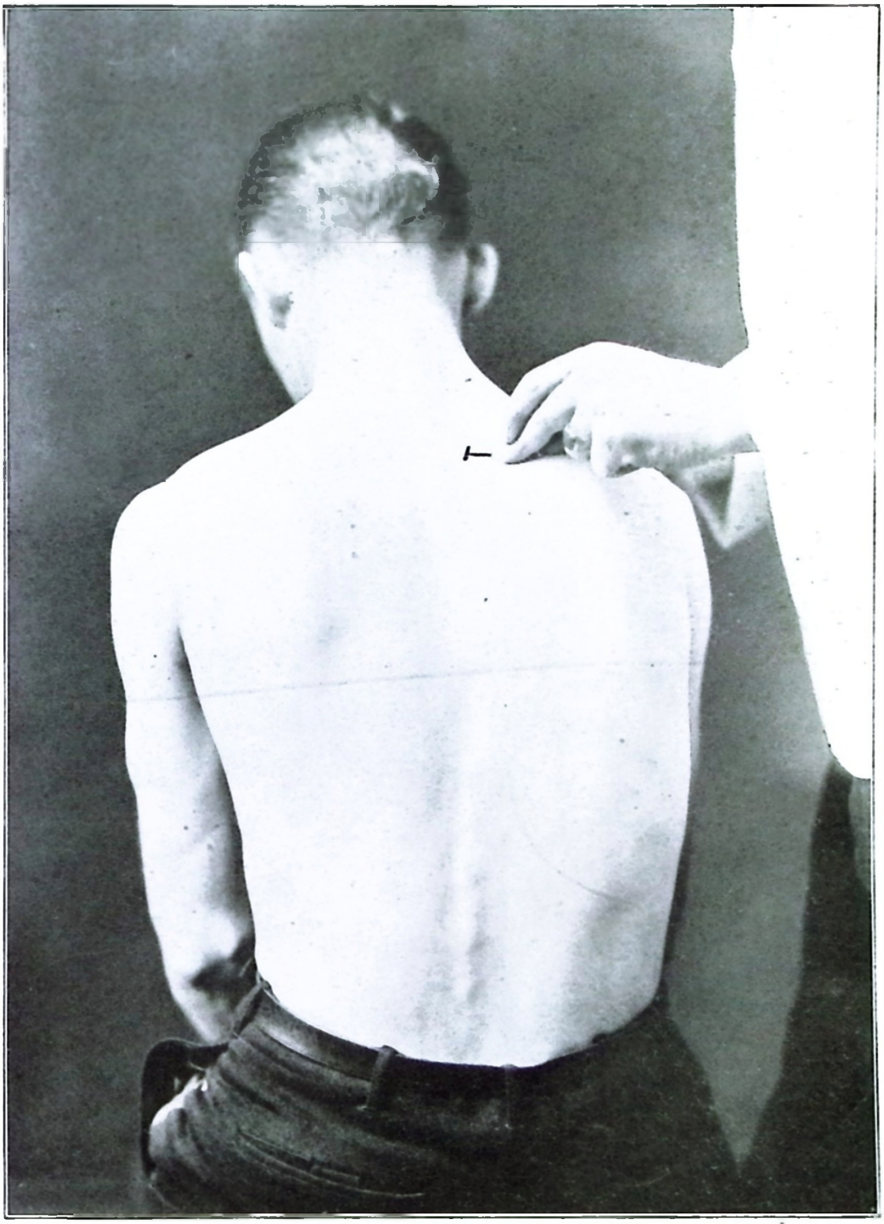
The practitioner may have been misled in his deductions as to the organ or tissues affected according to the symptoms obtained in the case and thus fail to elicit any tenderness in the suspected area. Should this obtain, he ought then to palpate along the course of the spine to see if any tender nerves might there be located, and locating them he should follow their

Cut 162



Correct Position of Fingers Marking First Point of Tenderness

Cut 163



Marking the Second Point of Tenderness

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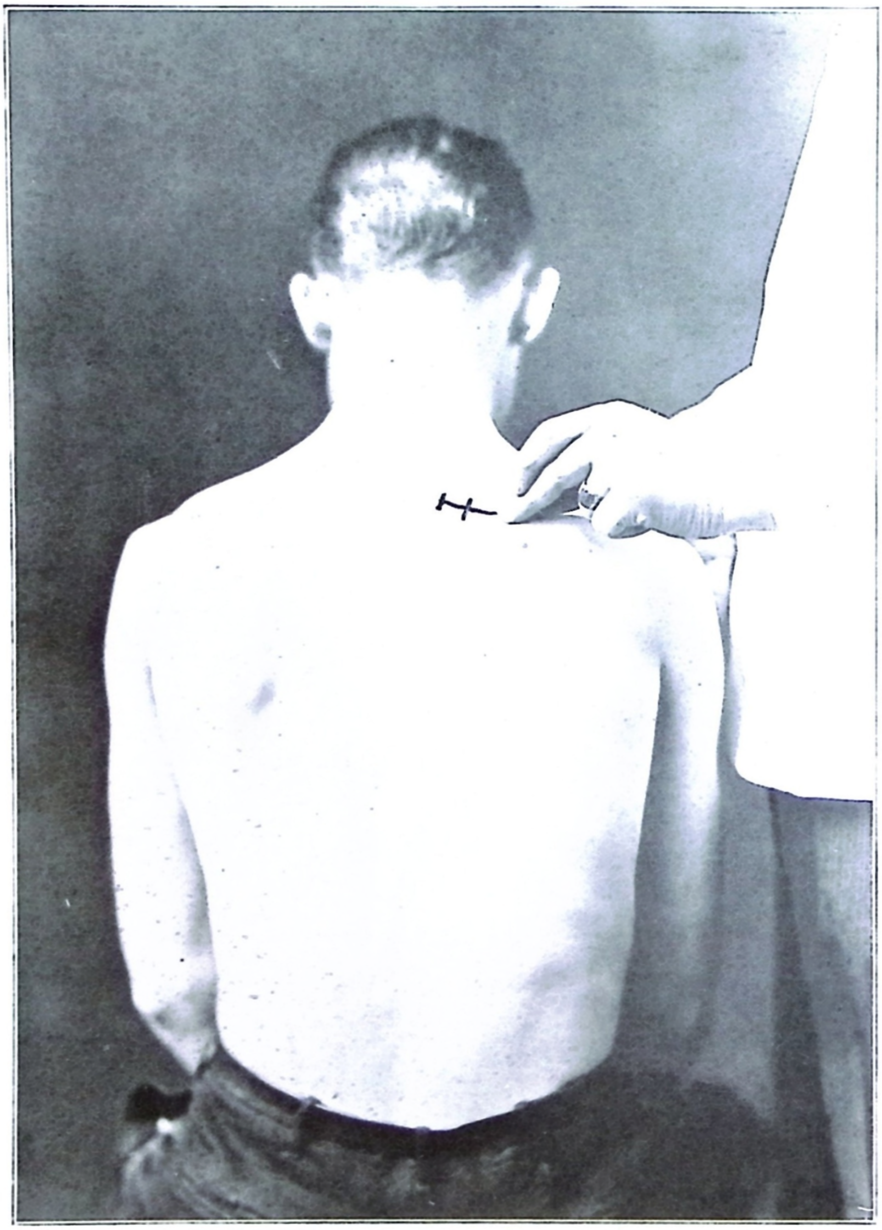
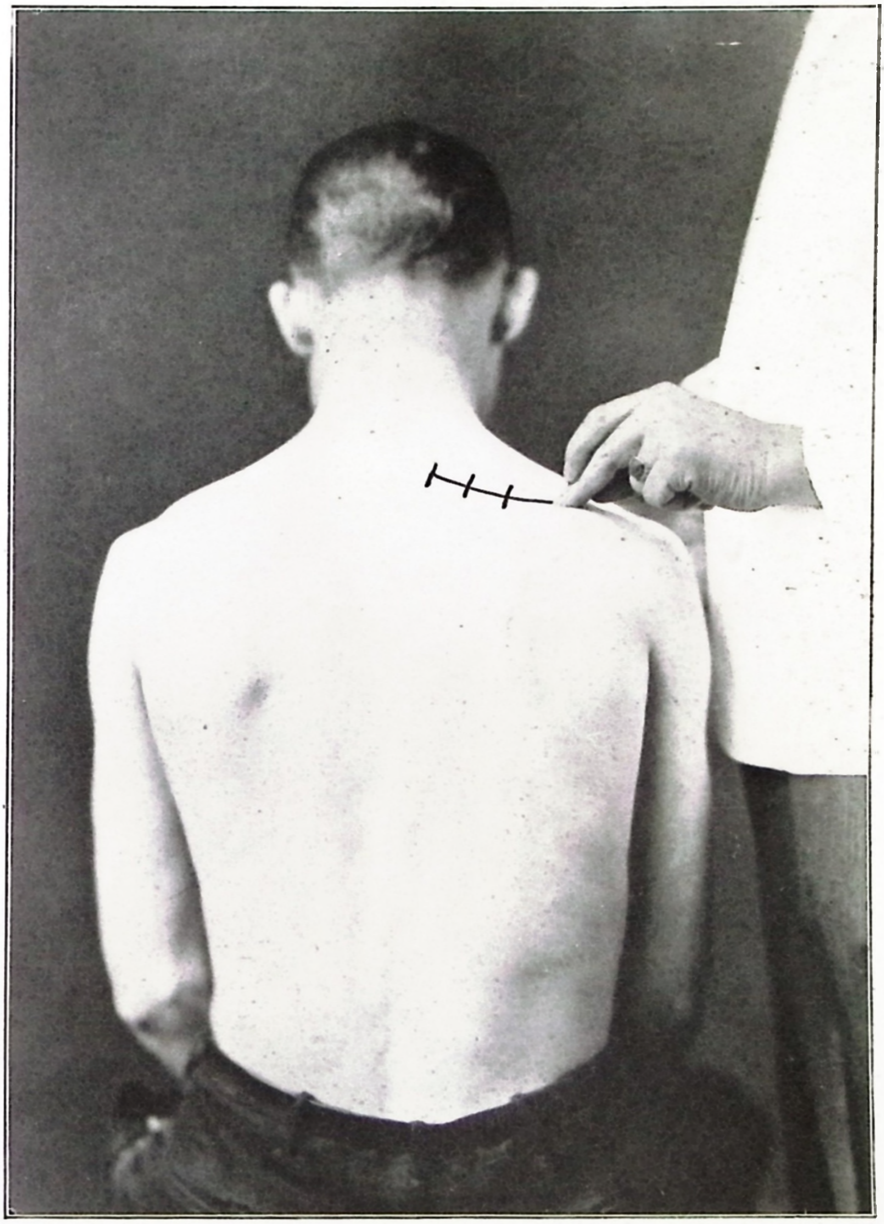


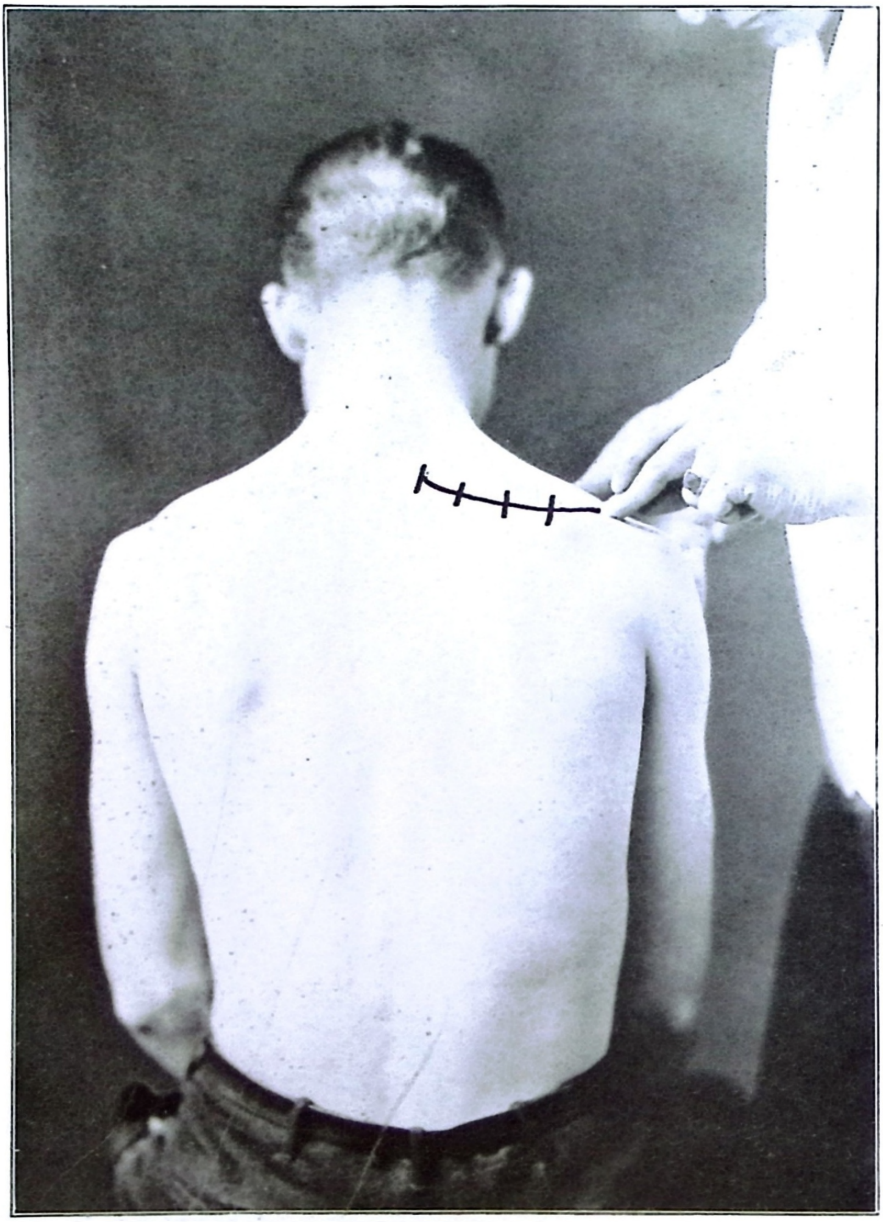
Marking the Third Point of Tenderness

Cut 165



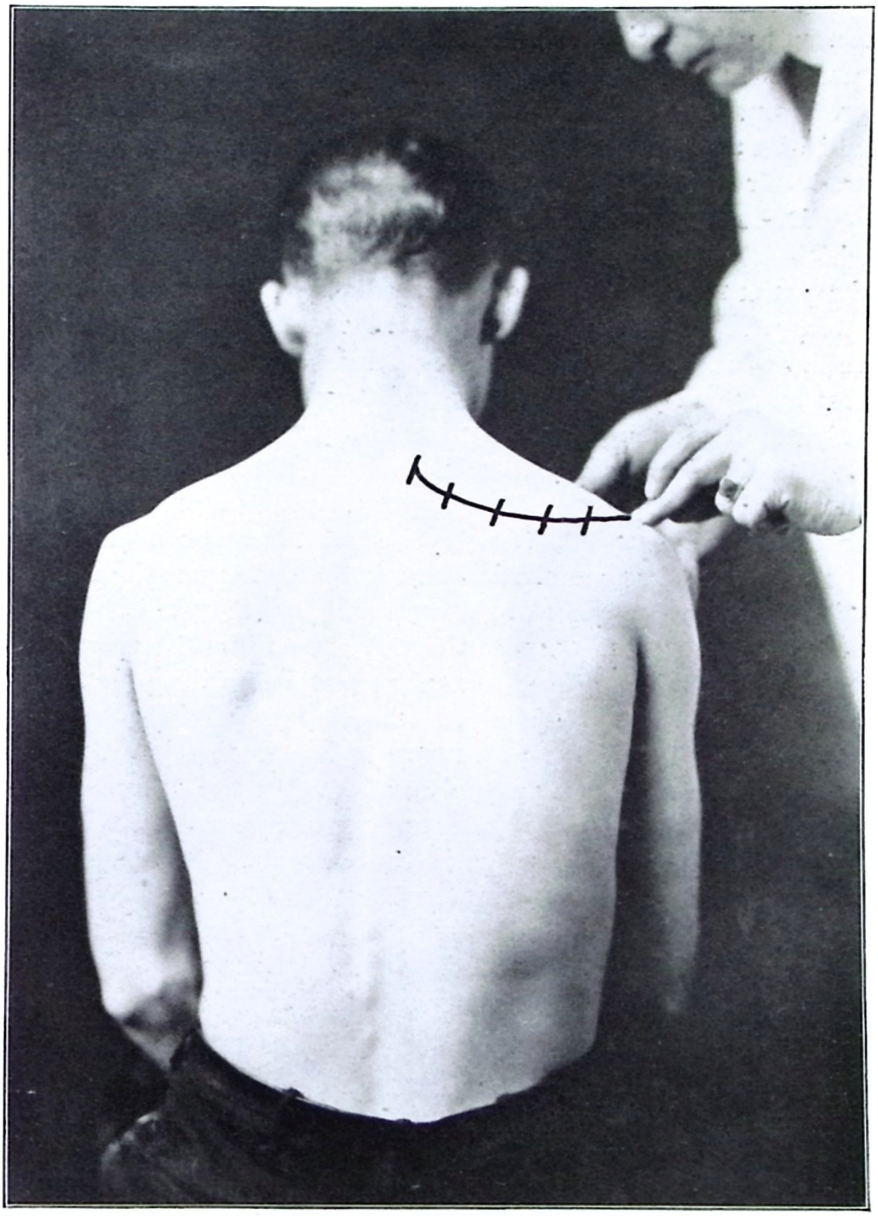
Marking the Fourth Point of Tenderness

Cut 166



Marking the Fifth Point of Tenderness, Also Showing How Patient is Supported When Tracing in This Region

Cut 167



Marking the Sixth Point of Tenderness

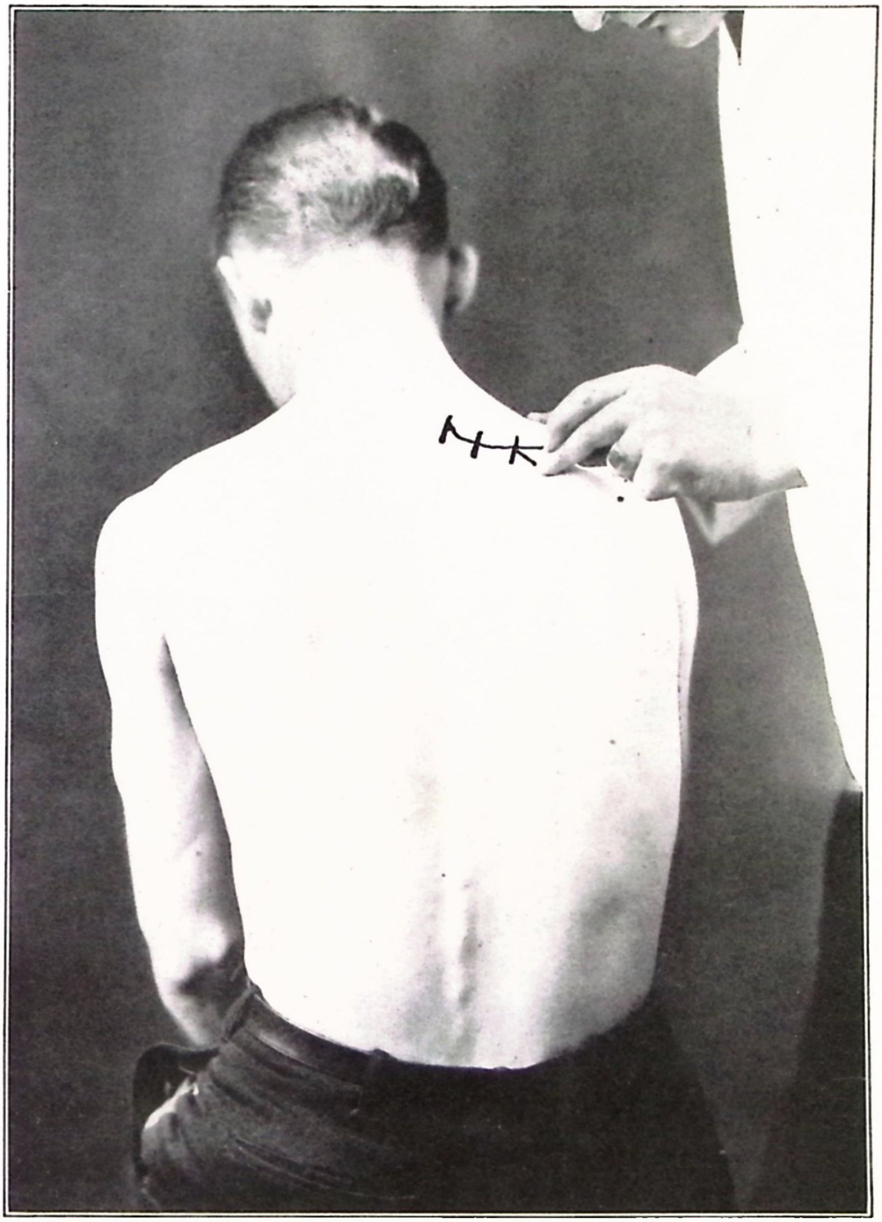
course to the periphery, thereby locating other organs or tissues than those he expected were primarily affected from the symptoms given. This will throw new light on the case and lead him unerringly to the etiological factors concerned in the production of the incoördination.

Due cognizance must be taken of the fact that all nerves which might be traced do not produce the same sensation to the patient and therefore as much depends upon the patient's interpretation of the impressions as upon the technique and ability of the palpator. In view of this fact, the patient should first be properly instructed that he may be able to inform the palpator if all the points of pressure produce similar sensations. It is necessary to ask the patient to concentrate his mind and thereby be enabled to properly distinguish the various kinds of sensations. Whenever a point is reached where the pressure produces a sensation that is not the same, the patient will inform the palpator of this fact and he will then know that he is upon a different nerve than the one which he started to trace and should continue to apply pressure until a point is located where the right kind of sensation is again produced. After having traced the first nerve to its termination, the palpator should return to that point where first the different sensation was located and make a tracing of this second nerve to its spinal origin and peripheral termination. In tracing the second nerve, it might obtain that still another kind of sensation might show itself and it would then be necessary to likewise make a tracing of the third tender nerve and follow this method until no further tenderness alike or different in nature was disclosed.

RELATION OF SPINAL TENDERNESS TO CAUSATIVE SUBLUXATIONS

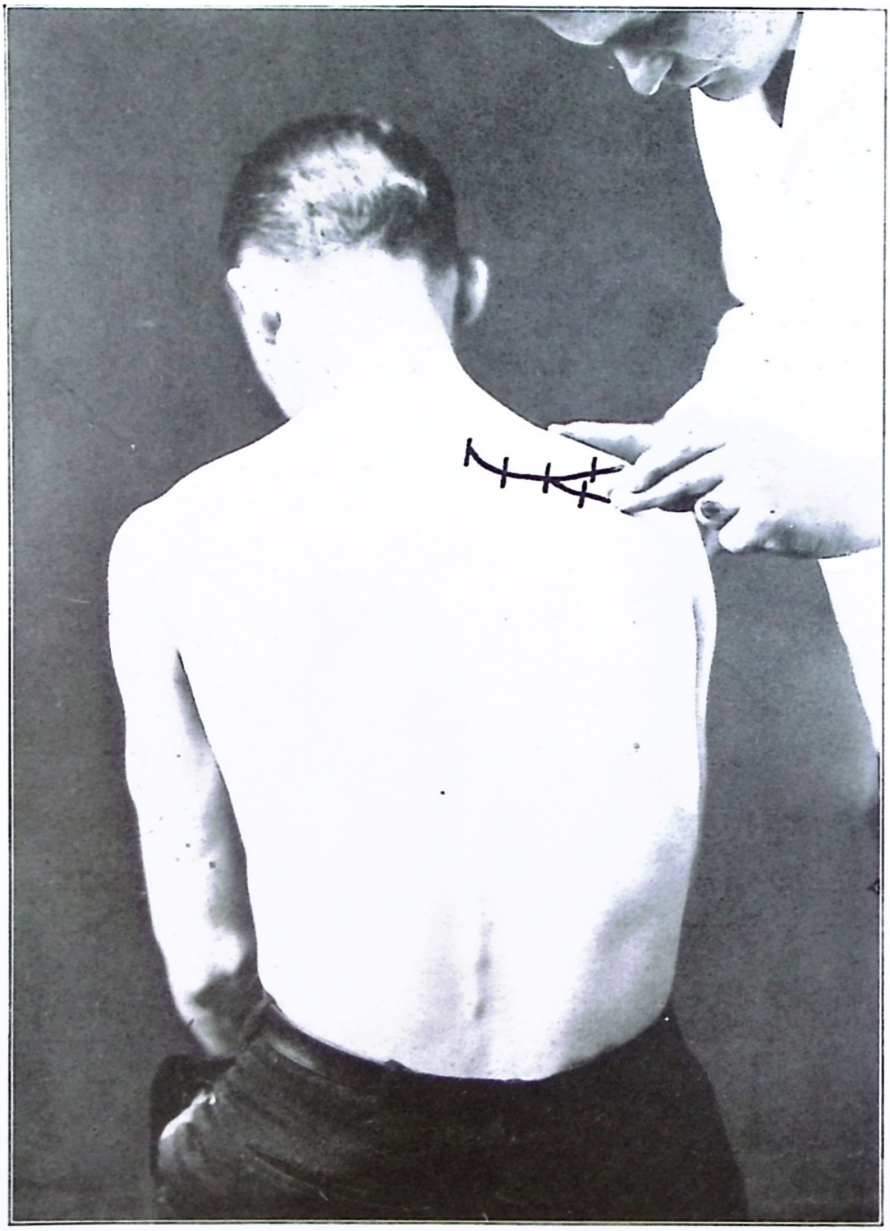
When the spinal origin of a tender nerve has been determined by palpation of the tenderness along the spine or by tracing the nerve from its periphery to this point, it should be borne in mind that then we have located that intervertebral

Cut 168



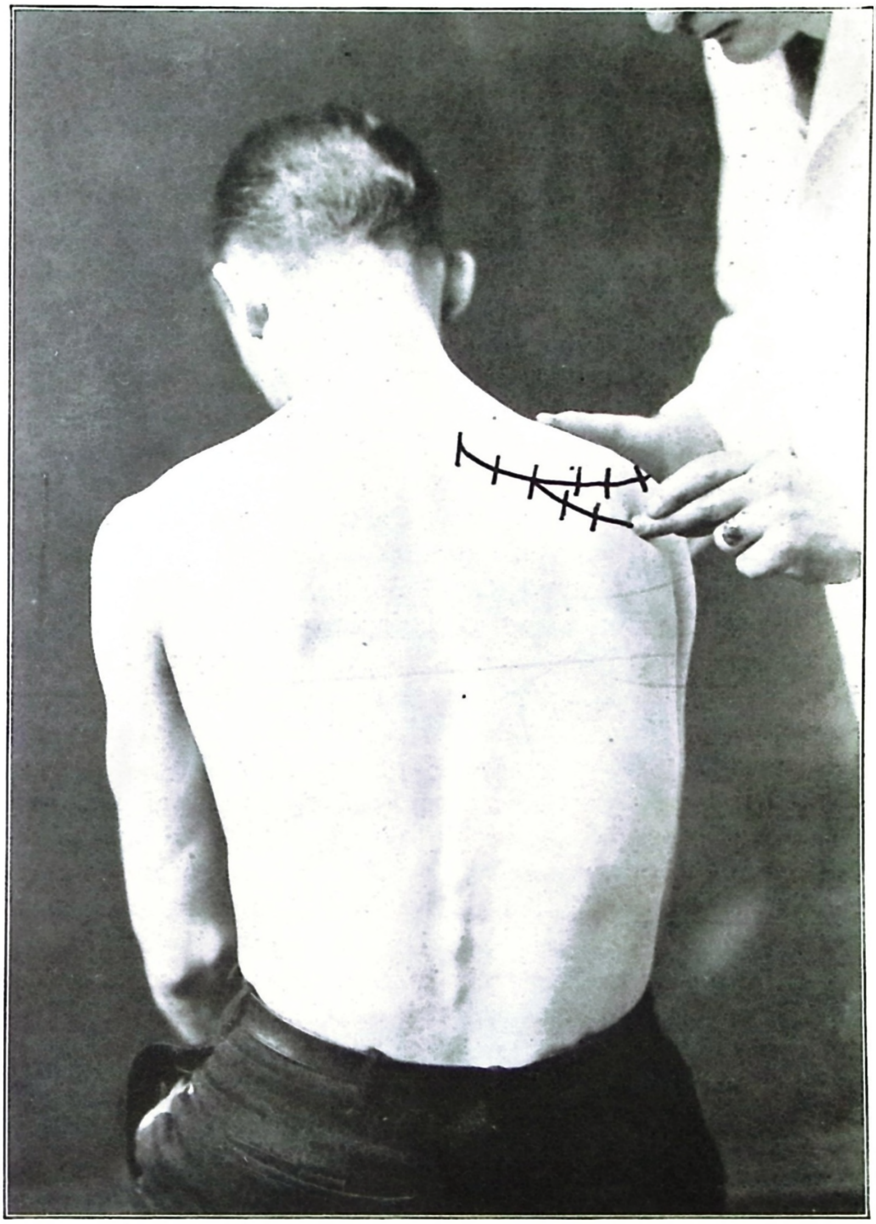
Showing First Point of Tenderness Where Nerve Branches

Cut 169



Showing Second Point of Tenderness Where Nerve Branches

Cut 170



Showing the Third Point of Tenderness Where Nerve Branches

foramen, bounded above and below by the pedicles of two adjacent vertebrae, either of which may be subluxated, thus producing the pressure, which is causing such tenderness. Directly above and below this foramen the transverse processes of the two vertebrae in question are found, but the spinous processes have an entirely different relation to it. The location of these spinous processes is then determined by the relation which they bear to the transverse processes, which relation varies in different parts of the spine. This relation can be best determined by a close study of normal specimens or charts having pictures of such specimens. So that no mistake might be made, a thorough description of this relation as well as the point of exit of the nerve from the spine will now be given.

The human body for the convenience of studying the causative factors of disease and the nerves responsible for incoördination thru pressure upon them is divided into twenty-six meric zones, twenty-four of these zones corresponding to the twenty-four vertebrae of the spine, the twenty-fifth zone to the sacrum and the twenty-sixth to the coccyx. Each vertebra with a pair of spinal nerves superior to it is known as a vertemere and thus the atlas with the first pair of nerves is known as the first vertemere. This first pair of spinal nerves, aside from supplying the muscles mentioned, also supply through their connections with other nerves, the tissues of the brain, optic tract, bones of the cranium, upper parts of the external ear, scalp and forehead. As before mentioned, these nerves, particularly the posterior branches being superficial, are traceable along their paths of tenderness to incoördinations in the various structures mentioned. Clinical findings in hundreds of cases have proven this to be a fact and by the adjustment of the atlas such incoördinations have been relieved.

THE ATLAS VERTEMERE

The first pair of spinal nerves emit from the spinal column between the occipital bone and the atlas, just superior to the superior condyloid processes of the atlas, one inch to the

right and left of the median line and just a little superior to a plane passed horizontally thru the posterior arch of the atlas. At this point is where tenderness would be elicited if a subluxation of the atlas obtained. The pair of nerves inferior to the atlas are found to emit just posterior to the inferior condyles of the atlas and about an inch to the right and left of the median line and in a plane passed horizontally thru the posterior arch of the atlas. This pair of spinal nerves are given off at right angles to the spine and they are traceable from their points of exit on both the right and left sides of the spine if pressure is produced upon them by a subluxation of the atlas.

A tender nerve on the right side is traceable from its point of exit between the atlas and occiput to the right, following the curve of the occiput for a short distance, then passing superior to the mastoid process over to the upper part of the ear. A similar tracing is also possible on the left side if the existing incoördination is in the left ear.

Tender nerves are also traceable on either the right or the left for a short distance along the curve of the occiput where they seem to end. These nerves supply the tissues of the atlas and the immediate vicinity.

Nerves from the first zone are also traceable on the right along the curve of the occiput, upward over the mastoid process to the vertex of the skull, in their course giving off many branches which supply the scalp, and the cranial bones. Similar nerve tracings may be made of nerves emitting on the left side of the spine.

Other tracings made, show nerves traceable on the right or left over the back of the head to the vertex; thence to the forehead where they divide into a number of branches.

From the above nerve tracings as clinically observed we find that nerves of the first zone supply the cranial bone, scalp, forehead, atlas and parts of the ear. Incoördinations of the brain and optic tract have been relieved by adjustments of the atlas and hence it is logical to conclude that nerves

emitting in this region supply the above mentioned structures. Since these nerves are within the vault of the craninum their paths cannot be followed by nerve tracing.

THE AXIS VERTEMERE

The axis with the pair of spinal nerves superior to it constitute the second vertemere. This pair of nerves arise at a very slight angle from the spinal cord and have their points of exit just posterior to the posterior margins of the superior articulating facets. The first point of tenderness detected upon pressure of these nerves, if impinged by a subluxation of the axis, would be about three-eighths of an inch from the tip of the transverse process toward the median line and just a trifle above the plane passed horizontally thru the two transverse processes or about an inch and a half to the right or left of the spinous process and approximately three-fourths of an inch above the horizontal plane passed thru the tip of that process. The transverse processes of the axis are in relation to the tip of the spinous process about three-eighths of an inch to the superior and about an inch and three-quarters to the right and left of the median line.

Tender nerves in the second zone are traceable on the right side of the spine to the posterior part of the scalp, somewhat nearer the median line, than that part of the scalp which is supplied by nerves from the first zone. Other nerves can be traced on the right side from the second zone to the external ear. In some cases it is possible to trace tender nerves from the axis to the supraorbital region. These pass upward back of the ear, thence thru the temple to the region above the orbit or they may be traced from their point of exit over the angle of the mandible upward along the ramus of the jaw to the temple and thence to the orbital region. Similar tracings to those above described may be made of nerves emitting on the left side of the spine to incoördinations existing in similar structures on the left side.

From the above tracings we may see that the nerves from

the second zone supply the posterior part of the scalp, external ear and the orbital region. In comparing the structures supplied by nerves of the first and second zones and in some instances the superior of the third zone we find that they are the same and hence the reason why in some cases we adjust atlas and in other cases the axis or the third cervical vertebra to relieve similar incoördinations.

The pair of spinal nerves emitting inferior to the axis have their point of exit just inferior to the transverse processes and about one-fourth of an inch above the plane passed horizontally thru the tips of the spinous process of the axis and approximately one and one-half inches to the right and left of the median line.

THE THIRD CREVICAL VERTEMERE

The third cervical vertebra with a pair of spinal nerves superior to it constitutes the third vertemere. This pair of spinal nerves is given off from the spinal cord at an angle just a little greater than the second pair of spinal nerves and from here downward each successive pair arises at a little greater angle than the preceeding pair down to the first lumbar pair of spinal nerves inclusive. Below this point the origin of each succeeding pair of spinal nerves is in the region of the second lumbar vertebra, from which point they pass downward to make their exit thru the respective foramina in the lower lumbar, sacral and coccygeal regions. The reason for this is that the spinal cord in the adult human body ends in the region of the first lumbar vertebra.

The third pair of nerves make their exit thru the intervertebral foramina on the right and left of the spine just inferior to the transverse processes of the axis, superior to the transverse processes of the third cervical and anterior to the superior articulating processes. In relation to the tip of the spinous process of the third cervical vertebra this pair of nerves is about a half an inch above a plane passing horizontally thru this spinous process and a fourth of an inch above the plane

passed horizontally thru the tip of the spinous process of the axis. The point of exit of the pair of spinal nerves inferior to the third cervical vertebra is in the plane passed horizontally thru the tip of the spinous process of that vertebra and about an inch and a half to the right and left of the median line.

The nerves of the third zone supply the nasal passages, retina, teeth, orbital region and cheeks. When incoördinations obtain in any of these tissues as a result of the subluxation of the third cervical vertebra tender nerves are traceable on either side of the spine depending upon which side the incoördination is manifest.

Tender nerves are traceable from their points of exit superior to the third cervical vertebra on the right side over the neck crossing the angle of the jaw and branching over the tissues of the check. Tracings may be similarly made on the left side.

Tender nerves may also be traced from their point of exit on the right or left of the median line to the teeth in both the upper and lower jaws. Nerves from the third zone are also traceable from their points of exit to the right or left over the neck below the ear, thence passing upward and forward, inferior to the zygoma to be distributed to the tissues of the nose. In some cases the nerves supplying the tissues of the nose may pass from their point of exit upward behind the ears and thence over the temple and downward over the zygoma to the nose. Nerves from the third zone are also traceable from their points of exit on the right or left over the neck, forward and slightly upward to the external region of the ears.

Nerves from the third zone which supply the retina are situated deeply and their paths cannot be followed by palpation because no pressure can be brought to bear upon them.

THE FOURTH CERVICAL VERTEMERE

The fourth pair of spinal nerves together with the fourth cervical vertebra comprise the fourth vertemere. These

nerves have their points of exit on the right and left of the spinal column just inferior to the transverse processes of the third cervical and superior to the transverse processes of the fourth cervical vertebra. They arise at a point anterior to the inferior articulating processes of the third cervical vertebra above, and superior to the articulating processes of the fourth cervical vertebra below. Their exit is in a plane passing horizontally thru the spinous process of the third cervical vertebra and about one and one-half inches to the right and left of the median line. In relation to the plane passing horizontally thru the tips of the spinous process of the fourth cervical vertebra this pair of nerves is about half an inch to the superior and about one and one-half inches to the right and left of the median line of that process. The transverse processes of the fourth cervical vertebra are about a quarter of an inch to the superior of the plane passing horizontally thru the tip of the spinous process and about one and one-half inches to the right and left of the median line of that process. From the relation of the point of exit of this pair of spinal nerves to the transverse processes and to the spinous processes of the vertebrae above and below the first point of tenderness should be easily located.

The Chiropractor traces tender nerves from the right superior intervertebral formamina and upward to a point below the external auditory meatus. From this point the path of the nerve may be upward in front of the ear thru the temple, along the supraorbital ridge, thru the supraorbital notch to the nerves of the eye producing sight direct. The path of this tender nerve from a point below the ear may be followed in some cases upward over the mastoid process, forward above the external ear, thru the temple and along the supraorbital ridge to the eye and orbital structures. In a great many cases both these branches may be traced and similar tracings as above described obtain on the left side providing the left spinal nerve is impinged by a subluxation.

Tender nerves may also be traced from the fourth zone to

the posterior nares and nasopharynx and nose. These usually pass below the ear inferior to the zygoma, directly to the tissues above mentioned. In a few cases these nerves have been traced upward back of the ear, forward above the ear and downward to the tissues of the nose and nasopharynx.

In a number of cases nerve tracings reveal that certain nerve fibers from the fourth zone pass downward and forward to the hyoid bone, others to the tissues of the mouth and yet others to the skin and integument of the upper part of the cervical region. Nerves are traceable on either the right or the left of the spine forward over the angle of the jaw to the gums and to the bones of the face.

Adjustments of the fourth cervical vertebra have in a number of cases corrected certain incoördinations of the eustachian tubes and inner ears and hence it would be only logical to conclude that nerve fibers supplying these structures have their origin in this zone. Nerve tracing shows fibers emitting from the foramina superior to the fourth cervical vertebra, thence passing upward and forward to the angle formed by the descending ramus of the jaw and the mastoid process of the temporal bone where they become deep and pass beneath osseous structures thus being no longer traceable.

Adjustments of the fourth cervical vertebra also relieve any incoördinations existing in the hard or the soft palate and the nerves supplying these structures are traceable from their point of exit for only a short distance and become lost under the osseous structures of the face.

From the above nerve tracings made in the fourth zone, we find by summing up, that the organs and tissues supplied by them are the eyelids, retina, orbital regions, internal ears, eustachian tubes, bones of the face, gums, teeth, nasel passages, nasopharynx, nose external, mouth, soft palate, hard palate, hyoid bone, and frequently some of the superficial tissues of the upper cervical region.

Certain ones of the nerves that have their exit from the spinal column superior to the atlas, axis, third and fourth cer-

vical vertebra, join to form the anterior cervical plexus and their anatomical distribution, names, and parts which they supply are thoroughly described in the text on Chiropractic Anatomy Vol. IX.

THE FIFTH CERVICAL VERTEMERE

The fifth cervical vertebra with the pair of spinal nerves superior to it comprises the fifth vertemere. These nerves have their exit about one and one-half inches to the right and left of the median line, inferior to the transverse processes of the fourth cervical vertebra, anterior to the superior articulating processes and superior to the transverse processes of the fifth cervical vertebra. In relation to a plane passed horizontally thru the tips of the spinous process of the fourth cervical vertebra these nerves are about one-fourth of an inch to the superior. They are about three-fourths of an inch superior to the plane passed horizontally thru the spinous process of the fifth cervical vertebra and about one and one-half inches to the right and left of the median line. The transverse processes of the fifth cervical vertebra are in a plane which is about one-half an inch superior to the tip of the spinous process.

The inferior pair of nerves below the fifth cervical vertebra, have their exit in a plane drawn horizontally thru the spinous process of the fourth cervical vertebra and about one-half an inch to the superior of the plane passed horizontally thru the spinous process of the fifth cervical vertebra and an inch and one-half to the right and left of the median line.

The spinal nerves of the fifth zone supply the retina, nose, face, teeth, posterior and lateral muscles of the neck and the hyoid bone. Thus we see from the study of the above zones that they are found to overlap and the peripheries which these nerves supply are in a number of instances exactly the same. It is for this reason that sometimes one vertebra and sometimes another may be adjusted to relieve similar incoördinations in different cases.

Tender nerves from the fifth zone are traceable from their points of exit on either the right or left of the median line outward and upward over the neck to the hyoid bone. Other tracings show that the nerves pass from their point of exit slightly upward and forward supplying the muscles on the side and posterior parts of the neck. Nerve tracing also reveals nerves in this zone traceable upward and forward from their points of exit superior to the fifth cervical vertebra on the right and left sides over to the angle of the jaw, thence pass under the osseous structures to supply the teeth and for this reason cannot be traced along their entire course.

The Chiropractor by his method of nerve tracing is capable of following along the path of tender nerves from their exit superior to the fifth cervical vertebra on either the right or left sides of the spine, as the case may be, forward and slightly upward to the angle of the mandible and from this point follow the branches of such tender nerves that are distributed to the sides of the face. Nerve tracing further shows fibers emitting superior to the fifth cervical vertebra passing upward and forward to the angle of the jaw, thence inferior to the zygoma from which point they branch upward, downward and forward to be distributed to the tissues of the nose.

In a number of cases adjustments of the fifth cervical vertebra have corrected incoördinations existing in the sight of the eyes, particularly in those cases where the retina is affected. Such a nerve tracing can be made from the point of exit of these nerves to a point below the external auditory meatus whence they become lost under the osseous structures of the mandible. Only occasionally is it possible to trace these nerves upward along the descending ramus of the jaw in front of the ear thru the temple along the supraorbital ridge to the supraorbital notch at which point they disappear into the orbital cavity.

In a number of instances adjustments of the fifth cervical vertebra have been found to relieve incoördinations of the ears, and nerve tracing reveals that fibers do have their origin su-

perior to the fifth cervical vertebra and are thence traceable upward to the concha of the ear where they become lost. Even though it is impossible to trace the fiber to the structures of the ear no doubt exists that it does supply the ear as adjustments have in a great many instances relieved such incoördinations.

In some cases it has been found that tender nerves having their exit superior to the fifth cervical vertebra are traceable downward and forward to the shoulder, outward over the shoulder to the articulation of the shoulder joint and thence down the arm and in a number of cases not only is it possible to trace such fibers on either side but it is found that many branches are given off from them, the tender paths of which may also be followed. Only a few cases exist where the nerves of the fifth zone have been found to supply the structures of the anterior part of the lower cervical region or the larynx.

THE SIXTH CERVICAL VERTEMERE

The sixth cervical vertebra with the nerves superior to it is known as the sixth vertemere. This pair of nerves has its exit from the intervertebral foramina on the right and left of the spine about one and one-half inches away from the median line. They make their exit from the spinal column inferior to the transverse processes of the fifth cervical vertebra, superior to the transverse processes of the sixth, and anterior to the superior articulating processes also of the sixth cervical-vertebra. They arise in a plane passed horizontally thru the spinous process of the fourth cervical vertebra and one-half inch superior to a plane lying horizontally thru the tip of the spinous process of the fifth cervical vertebra and about one and one-fourth inches superior to the plane lying horizontally thru the tip of the spinous process of the sixth cervical vertebra. The spinous process of the sixth cervical vertebra is one inch below the plane passed horizontally thru the transverse processes of that vertebra and that tips of those

transverse processes in this plane are one and three-fourths inches to the right and left of the median line.

The pair of nerves inferior to the sixth cervical vertebra emit from the spine in a plane drawn horizontally thru the tip of the spinous process of the fifth cervical vertebra and three-fourths of an inch superior to the spinous processes of the sixth cervical vertebra. Their exit is about a quarter of an inch toward the median line from the tips of the transverse processes of the sixth cervical vertebra and about one and one-fourth inches to the right and left of the median line.

Tender nerves are traceable from their points of exit superior to the sixth cervical vertebra on the right and left of the median line around the neck slightly downward and forward to the trachea where they split up in a number of small branches. Other tracings of nerves in this region show that a tender path may be followed from the exit of the nerves on the right or on the left over the shoulder down the anterior side of the arm and forearm to the hand and to the fingers. The course that these tender nerve fibers seem to follow over the shoulder and downward over the upper extremity vary considerably in different cases, as do also the number of tender branches that may be given off from these fibers. The different tracings show that nerves from the sixth zone supply, in different cases, all of the tissues over the shoulder and also for a certain distance downward over the anterior and posterior parts of the shoulder. They further show the different regions of the arm, forearm, and hand may be supplied by the various branches of these nerves. This again goes to prove that distribution of nerves in different individuals is not exactly the same, nor do the nerves always have exactly the same exit from the spinal column.

Clinical findings show that there are some cases where it appears that tender nerves may be traced from their points of exit superior to the sixth cervical vertebra forward and upward over the cervical region to the tissue of the thyroid

gland, but this is only to the "meric neck" and its tissues, not to the tissues of the "meric throat."

In some cases adjustments of the sixth cervical vertebra have relieved incoördination of the proper bronchi and in such cases tender nerves might be traced from their points of exit superior to the sixth cervical vertebra on the right or left of the median line around the root of the neck to the episternal notch where they become lost.

From the above nerve tracings in the region of the sixth cervical vertebra we can readily see that the structures supplied by these nerves are the trachea, the external tissues of the lower cervical region, the tissues of the shoulder, the arm, forearm and hand and in some cases also the bronchi and the tissues of the meric neck.

THE SEVENTH CERVICAL VERTEMERE

The seventh cervical vertebra with the pair of nerves above it is known as the seventh vertemere. These nerves make their exit from the spinal column one and one-fourth inches to the right and left of the median line and in a plane passed thru the tip of the spinous process of the fifth cervical vertebra. In relation to a plane passed horizontally thru the tip of the spinous process of the sixth cervical vertebra they are about one inch to the superior and one-fourth of an inch toward the median line from the tip of the transverse procesess of that vertebra. These nerves are one and one-half inches superior to a plane passing horizontally thru the tip of the seventh cervical vertebra, slightly above the transverse processes of that vertebra and one-half an inch from the tips of these transverse processes toward the median line. The tips of the transverse processes are approximately one and one-half inches to the right and left of the median line. A straight line drawn from the tip of the spinous process to the tip of either transverse process of the seventh cervical vertebra would be very nearly two and one-fourth inches in length. A similar line drawn from the tip of the spinous process of the

sixth cervical vertebra to the tips of its transverse processes would be slightly less than two inches in length. A similar line drawn from the tip of either transverse process to the tip of the spinous process of the fifth cervical vertebra would measure one and three-fourths inches in length. Similar measurements in connection with the spinous and transverse processes of the fourth and third cervical vertebra would be just a trifle more than one and one-half inches in length and that of the axis would measure very nearly two inches.

If this pair of nerves is impinged by a subluxation of the seventh cervical vertebra, then the measurements above given would determine where the first point of tenderness might easily be located upon pressure.

The nerves inferior to the seventh cervical vertebra make their exit in a plane passed horizontally through the tip of the spinous process of the sixth and about one inch superior to the plane through the spinous process of the seventh cervical vertebra. The posterior branches of these nerves are located as defined by these planes and one and one-fourth inches to the right and left of the median line between the transverse processes of the seventh cervical and first dorsal vertebrae. The anterior divisions of this pair of nerves can only be located as defined by these planes and will be found one and three-fourths inches to the right and left of the median line.

A number of different tracings may be made of nerves in the seventh vertemere which go to show that the parts supplied by them are the trachea, bronchi, muscles in the lowest part of the neck, structures of the shoulder, arm, forearm and hand. From the above we see again how the lower cervical zones overlap and the similarity that exists between the tissues supplied by the fifth, sixth and seventh pair of cervical nerves. The seventh cervical, however, is very seldom subluxated.

Tender nerves are traceable from their points of exit through the foramina superior to the seventh cervical vertebra on the right and left of the spine, and when an incoördination exists in the muscles of the neck a number of branching fibers

are traceable in this region only for a short distance away from the point of exit of these nerves. In cases where an incoördination exists in the bronchi, nerves superior to the seventh cervical vertebra may be traced on either the right or left sides of the spine around the root of the neck over the anterior part down to the episternal notch where the tenderness is lost.

In the tracing of nerves from the seventh cervical vertebra to the tissues of the shoulder, arm, forearm and hand different courses of nerves may obtain and many branches may be found as being given off from these tender nerves depending upon the extent of the periphery that is affected. We again see that these nerves in different cases do not follow exactly the same course but in main are found to supply similar structures.

Tender nerves from the superior of the seventh cervical vertebra may also be traced either on the right or left of the spine in a straight line around the neck to the tissues of the trachea if incoördination in this region obtain as a result of subluxations.

Many years ago it was thought that the peripheral system was a part and separate from all other nerves and that it had no distinct connection with these nerves, but since then, anatomists have discovered that this system is only a rearrangement of the spinal nerves so situated that various internal organs might be properly supplied with mental impulses.

The cervical portion of the peripheral system consists of two ganglionated cords, one on either side of the spinal column, anterior to the cervical vertebrae. Each cord has developed upon it three enlargements or ganglia, known as the superior, middle and inferior cervical and from each of these ganglia are given off a number of peripheral branches that communicate with the spinal nerves.

From the superior cervical ganglion a branch passes upward through the carotid canal into the cranial cavity where it divides into the outer and inner divisions. The outer division forms the carotid plexus and the inner division forms the cavernous plexus. It is through these plexuses that the cranial

nerves are connected with the upper cervical spinal nerves, as all of the cranial nerves do establish communications with these plexuses with the exception of the olfactory. Cords from the cavernous and carotid plexuses pass upward and forward and are connected in the median line with the ganglion of Ribes. This ganglion, together with the plexuses, constitute the cranial part of the peripheral nervous system.

The inferior branch from the superior cervical ganglion passes downward and communicates with or becomes the superior branch of the middle cervical ganglion. The communicating branches from the superior cervical ganglion establish connection with the first, second, third and fourth cervical nerves as well as the vagus and hypoglossal.

The middle cervical ganglion is connected by a superior branch with the ganglion above and by an inferior branch with the ganglion below and through its rami communicants it is connected with the fifth and sixth cervical nerves.

The inferior cervical ganglion communicates with the middle one above and the first thoracic below, as well as the seventh cervical and the first dorsal spinal nerves.

What structures the peripheral nerves of the cervical region supply and what their anatomical tracings are is thoroughly described in the text on Chiropractic Anatomy, Vol. IX.

THE FIRST DORSAL VERTEMERE

This vertebra with the pair of spinal nerves superior to it constitute the eighth vertemere. We consider this pair of spinal nerves as the first dorsal, rather than as the eighth cervical, as is usually true in works on the subject of anatomy. This is for the reason that such an arrangement as this will conform in every detail to the meric system.

In this scheme the twelfth dorsal nerve will be considered as the first lumbar, the fifth lumbar will be considered as the first sacral, and the fifth sacral as the first coccygeal and the coccygeal will be known as the second coccygeal.

The eighth pair of nerves arise on a level with the tip

of the spinous process of the sixth cervical vertebra, one inch above the level of the spinous process of the seventh cervical vertebra and very nearly two inches above the level of the spinous process of the first dorsal vertebra.

The first point of tenderness when pressure is brought to bear upon the posterior divisions of this pair of nerves is at a point designated by the three levels above given, one and one-fourth inches to the right and left of the median line. The anterior division of these nerves is located by palpation at this same level, but very nearly two inches away from the median line.

This pair of nerves superior to the first dorsal vertebra is designated as the first dorsal or thoracic pair of spinal nerves. They make their exit from the spinal column anterior to the superior articulating processes of the first dorsal vertebra and are covered over the posterior by the laminae of the seventh cervical vertebra and for this reason it is necessary to go a greater distance outward from the median line before tenderness may be elicited if pressure is produced and if the nerves are impinged by a subluxation. A straight line drawn from the tip of the spinous process of the first dorsal vertebra to the tip of either transverse process would measure about two inches in length. The nerves from the eighth zone or the first dorsal vertemere supply the shoulder, arm, forearm, hand, bronchi, upper ribs, sternum, clavicle and muscles over the clavicle and upper parts of the scapula. We have mentioned in the discussion of the nerves from the fifth, sixth and seventh vertemeres that they supplied structures of the arm, forearm and hand, but in all these cases structures of the upper extremities so supplied are those of the anterior surface, while those of the posterior surface are supplied by nerves of the first dorsal vertemere.

Tender nerves emitting through the intervertebral foramina superior to the first dorsal vertebra may be traced from the right or the left over the shoulder, along the superior border of the scapula to the episternal notch where they are

lost. In incoördination of the muscles covering the clavicle tender nerves are traceable from the same point of exit to the affected periphery where a number of branches are given off supplying this part.

Nerves may be traced from either the right or the left of the median line outward in a straight line over the posterior margin of the shoulder to the shoulder joint, thence downward over the posterior of the arm, forearm, and hand. As in cases previously described, the course of these tender nerves is not exactly the same, nor are the number of tender branches given off from them the same in every case. The number of tender branches depending largely upon the area affected as a result of the subluxation.

Where incoördination exists in either of the first pair of ribs, a tender fiber is traceable along the first intercostal space from the point of the origin of the nerve clear around to the anterior where these ribs join on to the sternum. If the incoördination is in the region of the sternum a similar fiber may be traced and at its periphery a number of branches will be discovered, branching through the affected part. Nerve tracing further shows that certain fibers having their origin superior to the first dorsal vertebra are traceable on either side of the spine, depending, of course, as to which side the incoördination is found to exist, to the region over the upper part of the scapula.

In a few cases it has been clinically observed that a tender fiber is traceable from its exit on the left side superior to the first dorsal vertebra along the first intercostal space through the axilla and then slightly downward over the region of the heart. This would seem to indicate that in some cases few cardiac fibers have their origin as described.

THE SECOND DORSAL VERTEMERE

The second dorsal vertebra with the pair of spinal nerves inferior to it comprise the ninth vertemere. These nerves emit from the spinal column opposite the spinous process of

the seventh cervical vertebra and about one and one-fourth inches to the right and left of the median line. In relation to a plane passed horizontally through the spinous process of the first dorsal vertebra, this pair of nerves is about three-fourths of an inch to the superior and in relation to a plane passed horizontally through the tip of the spinous process of the second dorsal vertebra, the pair of nerves in question is approximately one and one-fourth inches to the superior. The nerves superior to the second dorsal vertebra arise anterior to the superior articulating processes of that vertebra.

The spinal nerves of the second thoracic zone or ninth vertemere supply the heart, pericardium, aorta, bronchi, forearm, hand, second rib and muscular and cutaneous structures in the immediate vicinity.

A tender nerve is traceable from its point of exit superior to the second vertebra on the left side through the second intercostal space, thence through the axilla, branching at the anterior over the region of the heart. Such a tracing is rarely possible on the right side.

Tender nerves are traceable in the second thoracic zone from their points of exit on the right or left, following the second intercostal space on the right or left to the posterior part of either shoulder, thence downward over the external posterior border of the arm to the forearm and hand. These supply the forearm and hand and in this region many branches spreading out over the periphery may be traceable, the number depending upon the extent of the incoördination.

In some cases of bronchial trouble we may find tender nerves traceable on either side in the second thoracic zone around through the second intercostal space to the right or left, through the axillae to the episternal notch where they become lost. Similar tracing may be made if there be any incoördination of the upper part of the sternum, except that the fibers are not lost at the episternal notch, but branch out over the affected part. In some cases these fibers are traceable from their points of exit on the right or left over the right

or left shoulders, downward over either clavicle, thence branching over the upper part of the sternum. If there exists any incoördination of the second pair of ribs or the muscles or skin in the second zone tender nerves may be traced from the center to the place where the incoördination is manifest.

Some of the nerve fibers emitting from the fifth, sixth, seventh, eighth and ninth zones connect with one another and give rise to that network of nerves anatomically known as the brachial plexus, which is fully described in the text on Chiropractic Anatomy, Vol. IX.

THE THIRD DORSAL VERTEMERE

The third dorsal vertebra and the pair of spinal nerves superior to it comprise the tenth vertemere. This pair of nerves has its origin from the spinal column in the plane passed horizontally through the spinous process of the first dorsal vertebra and about one and one-fourth inches to the right and left of the median line. In relation to the plane passed horizontally through the spinous process of the second dorsal vertebra, these nerves are about three-fourths of an inch to the superior and in relation to a plane passed horizontally through the spinous process of the third dorsal vertebra they are a little more than one and one-fourth inches to the superior.

This pair of nerves makes its exit superior to the superior articulating processes of the third dorsal vertebra and if impinged by a subluxation the first point of tenderness is elicited on a level with the spinous process of the first dorsal vertebra and about one inch to the right and left of the median line.

A tender nerve may be traced from its point of exit on the right side, superior to the third dorsal vertebra, through the third intercostal space, around the side of the body to the anterior over the right lung where branches are given off; the number and extent of these branches depending upon the area which is involved by the incoördination. A similar tracing may be made on the left side around the left of the body to the anterior over the left lung. If the incoördination exists in the posterior part of the lungs, a number of tender fibers are

traceable, branching over the back in the region of the incoördination. If the incoördination exists in the lateral portions of either lung, tender nerves from the third zone are traceable to this point and found to branch over the periphery.

A tender nerve may often be traced from the left superior foramen of the third dorsal vertebra around through the third intercostal space to the left over the region of the lower part of the heart where a number of peripheral branches may be given off. The extent of the branches is again determined by the area involved by the incoördination. Such a nerve tracing as this is rarely made of nerve fibers having their exit on the right side.

In cases of pleurisy, tender nerves are traceable to the periphery or that part of the pleura which may be affected, from their point of exit superior to the third dorsal vertebra. Should any incoördination obtain along the course of the third pair of ribs, muscles or skin covering them, tender fibers are found passing from their points of exit to that place in the tissue where the incoördination is manifest and the extent to which these tender branches are traceable depends upon the extent of the incoördination.

Tender nerves may also be traced from the third thoracic zone on the right and left of the median line around the side of the body thru the right and left axillae to the mammary glands providing an incoördination exists at this periphery. The nerve fibers will be found to branch and the extent of this branching will be determined only by the extent of the incoördination.

From the above nerve tracings made in the third zone, we find that the nerves supply the lower part of the heart, lungs, pleura, mammary glands, parts of the sternum, third pair of ribs, and the muscles and skin of this region.

THE FOURTH DORSAL VERTEMERE

The fourth dorsal vertebra with its superior pair of nerves comprises the eleventh vertemere. This pair of nerves arises

on a level with the spine of the second dorsal vertebra, three-fourths of an inch superior to a plane passed horizontally through the spinous process of the third dorsal vertebra and approximately one and one-half inches superior to the plane through the spinous process of the fourth dorsal vertebra. As already described in the tenth vertemere, tenderness is first elicited upon pressure about one and one-half inches to the right and left of the median line and at that point already designated by the position of the spinous processes of the second, third and fourth dorsal vertebrae.

The nerves of the fourth thoracic zone supply the liver, gall-bladder, bile duct, lower portion of the lungs, the fourth pair of ribs, and the muscles and skin in that immediate region.

Tender fibers may be traced from their point of exit on the right and left sides of the spine around through the fourth intercostal space to the posterior lateral and anterior portions of the lungs, depending solely upon the region of the lung where the incoördination may be manifest. In either of the three regions of the lungs mentioned these nerves may be found to branch considerably and the extent of the branching is determined only by the area of the lung that may be affected.

Tender fibers are traceable in the eleventh vertemere along the intercostal space, from their points of exit superior to the fourth dorsal vertebra on either the right or the left, to that point in the region of the muscles or skin or the ribs in the zone where the incoördination may obtain.

Tender nerves from the fourth zone having their exit through the right superior foramina may be traced through the fourth intercostal space on the right side around to the axilla, thence downward to the region of the liver, gall-bladder, or bile duct. If only a small portion of any of the above mentioned structures is affected, the nerves at that periphery will be found to branch only slightly, but if a large area is involved, the branching is much greater.

Tender nerves from the fourth zone are in many cases traceable on the right and left sides around through the fourth

intercostal space to the posterior or anterior walls of the thorax over the region of the pleura and from this fact adjustments for pleurisy may be given in the region of the foruth dorsal vertebra. This fact again goes to prove that the third and fourth dorsal vertemeres overlap and their peripheries supplied by these nerve fibers are the same.

In a number of cases nerve tracing shows that fibers may be followed from their points of exit on either the right or left, passing somewhat upward to the shoulder, thence downward over the arm and forearm on either side. In many instances these fibers are found to give off a number of branches to various parts of the periphery which they supply, their number and extent being determined by the extent of the incoördination. In yet other cases we find that tender nerves from the fourth thoracic zone may be traced from their points of exit on either the right or left of the median line, upward along the spinal column to the shoulder and thence upward along the side of the neck. Branching from here both to the anterior and posterior they supply the external tissues of the upper anterior and posterior parts of the cervical region and often passing upward in front or behind the ear are distributed to the temple.

THE FIFTH DORSAL VERTEMERE

The fifth dorsal vertebra and the pair of nerves above it comprise the twelfth vertemere. This pair of spinal nerves makes its exit from the intervertebral foramina superior to this vertebra on a level with the spinous process of the third dorsal vertebra nearly three-fourths of an inch above the level of the spine of the fourth dorsal vertebra and approximately one and one-half inches above the level of the spine of the vertebra in question. It is not necessary to repeat again where the first point of tenderness will be located as all these points from the second dorsal vertebra down to the twelfth dorsal vertebra are practically equidistant from the median line of the spine. The first points where tenderness by pres-

sure upon this pair of nerves may first be elicited is approximately one and one-half inches to the right and left of the median line.

The spinal nerves of the twelfth vertemere supply the liver, lower parts of the pleura, muscles of the arms, temples, and in some cases the lower portion of the esophagus and a portion of the stomach in the region of the cardiac valve.

Tender nerves in the fifth thoracic zone are traceable from their points of exit on the right and left sides of the spine through the intercostal spaces to the right and left around the sides of the body to the anterior where the fibers branch out over the lower portions of the chest when incoördinations of the pleura are found to exist. Nerves are similarly traceable through the fifth intercostal spaces from their point of exit to any place along the fifth pair of ribs or the muscles and skin over this region wherever an incoördination in these parts may obtain and at the seat of the incoördination these fibers spread out over the entire area that may be affected.

Tender fibers are also traceable from their points of exit on the right or left, upward along the spinal column, about one and one-half inches away from the median line, to the root of the neck and upward along the side of the neck, thence branching to the anterior and posterior. Other branches may follow upward in front or back of the ear to the temples. Here we see again the similarity of distribution of fibers from the fourth and fifth thoracic zones and hence in some instances the fourth dorsal vertebra may be adjusted for the incoördination and in others the fifth dorsal vertebra may be adjusted.

Tender nerves are in a number of cases traceable from the superior foramina of the fifth dorsal vertebra, upward along the spinal column branching out over the scapula, thence to the shoulders and downward over the external and anterior borders of the arm to the forearm.

The most typical and frequent nerve tracing from the fifth zone is that of the nerve fiber from the left superior foramen around the left side through the fifth intercostal space to the

anterior, and thence downward branching over the region of the liver. A similar nerve tracing on the right side is not impossible.

THE SIXTH DORSAL VERTEMERE

The sixth dorsal vertebra and the superior pair of nerves constitute the thirteenth vertemere. It will be observed that the spinous processes from the first dorsal to the ninth dorsal, generally speaking, increase in length and point more obliquely downward as we progress from the first to the ninth, then from the tenth to the twelfth inclusive, the spines get shorter and obliquity gradually disappears. From the above statement we must naturally conclude that the relations of the exits of the various pairs of nerves will be different in different levels of the spine.

The pair of nerves superior to the sixth dorsal vertebra make their exit on a level with the spine of the fourth dorsal vertebra and about seven-eighths of an inch superior to the level of the spine of the fifth and approximately two inches superior to the level of the spine of the sixth dorsal vertebra.

The relation that the points of exit of the spinal nerves bear to the tips of the transverse processes in different levels of the thoracic region is very nearly the same, except that in the upper thoracic region the transverse processes are somewhat longer and very gradually decrease in length from above downward to the twelfth dorsal vertebra. The relation in the lumbar region is somewhat different and will be hereinafter explained.

The nerves of the sixth dorsal vertemere supply the stomach, esophagus, pharynx, tongue, glands of the throat, sublingual, submaxillary and parotid glands, eyeballs, sixth pair of ribs and the muscles and skin over this pair of ribs.

Tender fibers from their points of exit on the right and left, superior to the sixth dorsal vertebra may be traced upward along the spinal column, on either side, about one and one-half inches from the median line of the spine, to the root

of the neck and thence upward over the neck to the angle formed by the descending ramus of the jaw and the mastoid process of the temporal bone. At this point they divide, one branch passing upward in front of the ear, and the other upward back of the ear, then both branches pass through the temple to the orbital region. One of these branches may pass above the eye, the other below, or they may come together and both pass above or below the eye. Sometimes the nerve fiber which passes upward back of the ear proceeds to the vertex of the skull and then forward and downward over the forehead to the supraorbital notch where it is lost. A tracing like the above is found, if any incoördination exists in the eye-ball.

Tender nerves from the thirteenth vertemere are traceable upward along the spine following the vertebral border of the scapula to the root of the neck and from here to the anterior and upward to the pharynx. Nerve fibers pass from the intervertebral foramina above the sixth dorsal vertebra, upward on either side of the spine along the side of the neck to the angle of the jaw from which point they pass inward to supply the salivary glands and the tongue.

Nerves may be followed through tenderness along their paths, from their exits superior to the sixth dorsal vertebra, upward along the spinal column over the neck to the anterior and be found to branch at the periphery where they supply the larynx or the glands of the throat, depending upon which structure is affected as a result of the subluxation of the sixth dorsal vertebra.

A very peculiar tracing of the nerves in this region sometimes obtains as follows: They course from their exit on either the right or the left side, upward along the spine over the shoulder downward over the clavicle, and along the lateral margin of the sternum, down to the apex of the ensiform cartilage where they become lost. These nerve fibers are found to supply the lower part of the esophagus and in some instances the upper part of the stomach.

Nerve fibers, when tender, are traceable from their points of exit on the right and left sides through the intercostal spaces over to the anterior of the body and there branch out over the region of the stomach.

If any incoördination obtains in the sixth pair of ribs, or the tissues surrounding them, then tender fibers are traceable from their exit to the part or parts where the effect obtains.

THE SEVENTH DORSAL VERTEMERE

The fourteenth vertemere includes the seventh dorsal vertebra with the pair of spinal nerves superior to it. Their exit is slightly below the level of the spine of the fifth, about one inch superior to the level of the spine of the sixth and approximately two and one-fourth inches superior to the plane passed horizontally through the spinous process of the seventh dorsal vertebra.

The nerves of the seventh thoracic vertemere supply practically the same tissues as do the nerves of the sixth dorsal vertemere, except that the throat, eyes, mouth, salivary glands, esophagus and the upper part of the stomach are more often supplied by the sixth thoracic pair of nerves, while the lower part of the stomach is supplied by the seventh thoracic pair.

The only difference there would be in the nerve tracings made to the eyes, mouth, salivary glands, tongue and esophagus from the seventh thoracic vertemere would be their slightly lower origin, due to their exit being superior to the seventh thoracic vertebra instead of superior to the sixth.

Besides the peculiar tracings possible from the seventh thoracic vertemere as above mentioned, nerve fibers may also be followed from their exits on the right and left of the median line, superior to the seventh thoracic vertebra to the right and left around the body forward and downward branching over the lower part of the stomach.

Nerves from the seventh thoracic vertemere also supply the seventh pair of ribs and the muscles and skin in that region.

Tenderness is traceable outward along the seventh intercostal space from the center to the seat of the incoördination.

THE EIGHTH DORSAL VERTEMERE

The eighth dorsal vertebra and the pair of spinal nerves superior to it make up the fifteenth vertemere. This pair of nerves makes its exit on a level with the spinous process of the sixth, one and one-half inches superior to a plane drawn horizontally through the tip of the spinous process of the seventh and approximately two and one-fourth inches superior to the level of the spine of the eighth dorsal vertebra.

The nerve fibers from the eighth thoracic vertemere supply the pancreas, spleen, diaphragm, duodenum, omenta, eighth pair of nerves and also muscles and skin in this immediate vicinity. The eighth pair of nerves overlap the seventh thoracic zone somewhat as in a number of cases tender fibers may be traced from their points of exit superior to the eighth dorsal vertebra, to the tissues of the stomach.

Tender nerves are traceable from their points of exit superior to the eighth thoracic vertebra on either the right or the left of the median line to the tissues of the eighth rib and the muscles and skin in this region. The course of the fibers is somewhat downward and forward and their extent is determined by the distance from the center that the periphery is located.

A tender nerve is traceable from its point of exit on the right side superior to the eighth dorsal vertebra around the right of the body to the region of the duodenum. A tracing such as this does not exist on the left side.

A tender nerve having its origin on the left side superior to the eighth dorsal vertebra is traceable in incoördination of the spleen over to the left, its fibers spreading out over the region of the abdomen to the left of the stomach. A tracing to the spleen does not obtain on the right side.

Tender nerves may be traced to the diaphragm on the right and left sides of the spine from their points of exit su-

perior to the eighth dorsal vertebra around the left or right side of the body, thence slightly upward where the tenderness is lost under the lower ribs. Tender nerves may also be traced from either the right or the left of the spinal column to the anterior where the fibers branch out over the abdomen in the region of the omentum.

THE NINTH DORSAL VERTEMERE

The ninth dorsal vertebra and its pair of spinal nerves comprise the sixteenth vertemere. These nerves have their exit from the spinal column about one-half an inch superior to the level of the spine of the seventh, one and one-half inches above the level of the spine of the eighth and approximately two and one-fourth inches superior to the plane passed horizontally through the tip of the spinous process of the ninth dorsal vertebra.

The nerves having their origin superior to the ninth dorsal vertebra supply the spleen, omenta, duodenum, ninth pair of ribs, and the muscles and skin in their immediate vicinity. From the above it is plain to be seen that the fifteenth and sixteenth zones overlap, in that the organs and tissues supplied by nerve fibers from these zones are the same. In some cases we would, therefore, adjust the eighth dorsal vertebra and in other cases the ninth dorsal vertebra for like incoördinations.

Tender nerves traceable to the spleen have their origin from the left superior foramina of the ninth thoracic vertemere. Those of the duodenum have their origin from the right superior intervertebral foramina of the ninth thoracic vertemere while those to the omenta, ninth pair of ribs and the muscles and skin in this region may have their exit on either side.

THE TENTH DORSAL VERTEMERE

The tenth dorsal vertebra and the nerves superior to it constitute the seventeenth vertemere. These nerves arise on a level one-fourth of an inch superior to the tip of the spinous

process of the eighth dorsal vertebra, one and one-fourth inches superior to the tip of the spinous process of the ninth dorsal vertebra and approximately two inches superior to the spinous process of the tenth dorsal vertebra.

The pair of spinal nerves having their origin superior to the tenth dorsal vertebra supply the suprarenal glands, upper part of the kidneys, eyelids, tenth pair of ribs, muscles and skin over this pair of ribs, and sometimes also the spleen.

A tender nerve is traceable on the left, having its exit from the intervertebral foramina on the left superior of the tenth dorsal vertebra, for a short distance outward from the spine and downward to the left suprarenal gland. A similar tracing is made of nerves on the right side to the right suprarenal gland.

Nerve fibers are traceable from their points of exit on either side of the spine along the intercostal space to any point along the tenth pair of ribs or muscles and skin covering them wherever the incoördination may be located.

A tender nerve fibre is traceable from its point of exit on the left, for a short distance forward and outward from the spine where the fibers branch over the region of the upper portion of the kidneys. A like nerve tracing would obtain of nerve fibers on the right side if the right kidney were affected.

In this zone there exists a very peculiar nerve tracing, namely that to the eyelids. The fibers make their exit from both the right and the left of the spine superior to the tenth dorsal vertebra and are traceable upward on either side of the spine, about one and one-half inches from the median line, along the vertebral border of the scapula to the root of the neck, thence upward to the angle formed by the descending ramus of the mandible and the mastoid process of the temporal bone. At this point they divide and one branch on either side is traceable upward in front of the ear inferior to the zygoma to the lower eyelid. The other branch of either side passes upward back of the ear forward thru the temple, crossing the supraorbital ridge and branching over the upper eye-

lids. In some instances the fibers passing upward back of the ears proceed to the vertex of the skull, thence downward over the forehead in a straight line to the upper eyelids.

A tender nerve fiber is in some cases traceable from the left superior intervertebral foramina outward over the back around the side of the body to the left of the stomach where its branches are distributed to the tissues of the spleen.

THE ELEVENTH DORSAL VERTEMERE

The eleventh dorsal vertebra and the pair of spinal nerves immediately above it comprise the eighteenth vertemere. This pair of nerves makes its exit from the spinal column on a level with the spinous process of the ninth dorsal vertebra, one inch above the level of the spinous process of the tenth dorsal vertebra and approximately one and three-fourths inches superior to a plane drawn horizontally thru the tip of the spinous process of the eleventh dorsal vertebra.

The eleventh pair of thoracic spinal nerves supply the kidneys, eleventh pair of ribs, and a strip of muscles and skin in this region. The nerves of this vertemere are found to supply similar structures as do the nerves of the seventeenth and nineteenth vertemeres, this showing again the system of overlapping fibers.

Tender nerve fibers are traceable from their points of exit on either the right or the left, superior to the eleventh thoracic vertebra along the course of the eleventh rib to the structures of these ribs and the muscles and skin over this region and also downward and forward over the muscles and skin of the abdomen, from the center to any points in these peripheries where any incoördination may obtain. Fibers are also traceable on the right or the left side obliquely downward for a short distance to the right or to the left of the spinal column branching over the posterior in the region of the kidneys.

The peculiar tracing to the eyelids as described in the tenth thoracic vertemere may also obtain in the eleventh

thoracic vertemere if a subluxation of the eleventh dorsal vertebra produces an incoördination in the eyelids.

THE TWELFTH DORSAL VERTEMERE

The twelfth dorsal vertebra with the pair of nerves superior to it comprise the nineteenth vertemere. These nerves emit from the spinal column on a level with the tip of the spinous process of the tenth dorsal vertebra, one inch superior to the level of the tip of the spinous process of the eleventh dorsal vertebra and approximately one and three-fourths inches superior to the tip of the spinous process of the twelfth dorsal vertebra.

The nerves of the twelfth thoracic vertemere supply the lower portion of the kidneys, ureters, lower part of the spinal cord, twelfth pair of ribs, and a strip of muscles and skin in this region.

Tender fibers are traceable on either the right or the left of the median line, obliquely downward for a short distance away from the spine branching out over the periphery of the lower portion of the kidneys. If an incoördination obtains in the ureters similar fibers, as above described, may be followed along their tender paths to the ureters. These pass more obliquely downward and for a greater distance than the fibers which supply the lower portion of the kidneys.

If an incoördination obtains in the twelfth pair of ribs or the strip of muscles and skin supplied by nerves of the vertemere tenderness is traceable along the course of these nerves from their point of exit to that place in the periphery where the incoördination is manifest.

THE DORSAL PERIPHERAL SYSTEM

The dorsal peripheral system consists of two ganglionated cords the number of ganglia usually corresponding to the number of vertebrae but in some cases two or more of these ganglia may fuse. We will here consider the number of gang-

lia in this system as corresponding to the number of vertebrae. This system in the thoracic region is situated on either side of the spine just in front of the heads of the ribs with the exception of the last two ganglia which are anterior to the bodies of the eleventh and twelfth dorsal vertebrae. Each one of the spinal nerves gives off communicating branches that join with its corresponding ganglion on each side and the ganglia in turn give off branches entering the spinal nerves.

This system of nerves is a rearrangement of spinal fibers, and though it is not definitely known, it may be that part which comprises the efferent or afferent halves of the cycle. All the branches in this system are deep and cannot be followed along their tender paths from the center to the periphery or from the periphery to the center. The nerves of distribution from this deep system that are given off from the upper five thoracic ganglia are distributed to the heart, aorta, lungs, pleura, and liver and according to the Chiropractic meric system and nerve tracing, previously given, we note that adjustments for incoordinations of the organs above mentioned are given in the region of the upper five thoracic vertebrae.

The meric system points out the fact that adjustments for the incoördination of the aorta and the heart are given in the upper dorsal region particularly the second dorsal vertebra. The meric system also points out the fact that adjustments of the upper dorsal vertebrae, particularly of the third vertebra, relieve incoördinations of the lungs and it may be that the deep nerves having their origin thru the same intervertebral foramina, as have the superficial traceable nerves, may contribute at least in part to the incoördination. Deep fibers arising in the region of the fourth and fifth dorsal vertebrae supply the pleura and the liver and again the meric system points out the fact that adjustments in this region relieve any existing incoördination. The deep fibers having their origin in the region of the sixth, seventh and eighth thoracic vertebrae are found passing to the stomach and may have something to do with the nerve supply of the stomach and as

proven by former nerve tracings in this region these vertebrae are adjusted for any existing incoördination.

The deep nerves arising in the region of the eighth thoracic vertebra supply the spleen, diaphragm, duodenum and omenta. Those arising in the region of the ninth thoracic vertebra supply similar structures. In the region of the tenth thoracic vertebra the deep nerves supply the suprarenal glands and kidneys and those from the twelfth thoracic vertebra also supply the kidneys.

From the above we can readily see that the deep and the superficial fibers supplying the different organs have exactly the same exits and consequently the subluxation producing pressure upon a superficial nerve would of necessity produce pressure also upon the deep nerve, therefore, the nerves which supply the heart, lungs, aorta, pleura, liver, stomach, spleen, kidneys, duodenum, ureters and suprarenal capsules are deep and superficial. The deep ones cannot be traced from their point of exit to the periphery where the incoördinations in these parts obtain but the nerves known as the superficial and corresponding in their exit from the spine with the exit of the deep nerves and in main supplying the above named organs can be traced and thus show where subluxations exist and where the Chiropractor would adjust to relieve existing incoördinations.

Aside from the structures mentioned as being supplied by the various thoracic spinal and peripheral nerves, these fibers also supply corresponding vertebrae, sections of the meninges of the spinal cord as well as the cord itself.

For a thorough description of the structure of the peripheral system, its location and the names of the various branches, see text book on Chiropractic Anatomy Vol. IX.

THE FIRST LUMBAR VERTEMERE

The first lumbar vertebra and the pair of spinal nerves superior to it comprises the twentieth vertemere. These nerves make their exit from the spinal column on a level with the tip

of the spinous process of the eleventh dorsal vertebra, three-fourths of an inch superior to a plane passed horizontally thru the tip of the spinous process of the twelfth dorsal vertebra and approximately one and three-fourths inches superior to the level of the spinous process of the first lumbar vertebra.

The first point of tenderness over the course of this pair of nerves, if impinged by a subluxation of the twelfth dorsal or the first lumbar vertebrae would be on a level with the spinous process of the eleventh dorsal vertebra and about one and one-fourth inches to the right and left of the median line.

The first pair of lumbar nerves supplies the greater part of the small intestines, the peritoneum, the lower part of the ureters, the first lumbar vertebra and a strip of muscles and skin over the anterior and posterior of the body in this region. If any incoördination exists in the skin or muscles included in this zone, tender fibers are traceable either on the right or the left of the spinal column to the seat of the incoördination.

Tender nerve fibers having their exit from the superior intervertebral foramina of the first lumbar zone are traceable to the right and left forward in a straight line around the side of the body to the anterior, where they branch out over the abdomen involving such an area of the intestines or the peritoeum as may be affected by the incoördination. Tender fibers from the first lumbar zone are also traceable on either side outward and downward, a short distance away from the spinal column, to the ureters providing any incoördination exists at this periphery.

THE SECOND LUMBAR VERTEMERE

The second lumbar vertebra with the second pair of lumbar nerves constitute the twenty-first vertemere. This pair of nerves make their exit from the spinal column on a level with the superior border of the tip of the spinous process of the first lumbar vertebra, one and one-half inches below the level of the tip of the spinous process of the twelfth dorsal vertebra and approximately one and one-fourth inches superior to

the upper border of the tip of the spinous process of the second lumbar vertebra.

The spinous processes of the lumbar vertebrae point almost straight posterior and at their extremities are very blunt, measuring approximately three-fourths of an inch from their superior to their inferior border, and in giving the relation of the exits of the spinal nerves to these processes it is necessary to designate either the upper or lower borders of the tips of these processes, as the points with which the comparison is made. The easiest possible way of designating the relation of the exits that the lumbar nerves bear to the spinous processes of the vertebrae is to say that they are on a level with the superior borders of the tip of the spinous process of the vertebra above.

The second lumbar pair of spinal nerves supply the lower portion of the small intestines, peritoneum, caecum, vermiform appendix, ovaries, the second lumbar vertebra and a strip of muscles and skin in their immediate vicinity.

A tender nerve fiber is traceable from its point of exit on the right side superior to the second lumbar vertebra in a straight line around to the side of the body and from this point slightly downward to the region of the appendix when any incoördination is found to exist. Such a tracing as this has never been found to obtain on the left side.

Tender fibers are traceable on either the right or the left from their exit thru the intervertebral foramina superior to the second lumbar vertebra, over the sides of the body to the anterior where they branch upward and downward over the abdomen and if any incoördination exists in the lower portion of the small intestines or the peritoneum, these fibers are traceable to the affected periphery and the area in which the tenderness is traceable depends upon to what extent the intestines or peritoneum may be affected.

If an incoördination exists in the caecum or the ilio-caecal valve a nerve may be traced from its exit on the right side superior to the second lumbar vertebra to this part, following

in a straight line from its point of exit around the right side of the body to the seat of the incoördination.

In a number of cases tender nerves have been found and their tender path followed from their points of exit superior to the second lumbar vertebra, downward toward the crests of the ilii, thence thru the inguinal region to the ovaries where the branching obtains in degree proportional to the existing incoördination. Ordinarily this tracing obtains in the third lumbar vertemere and sometimes even in the fourth.

THE THIRD LUMBAR VERTEMERE

The third pair of lumbar nerves and the corresponding vertebra comprise the twenty-second vertemere. These nerves arise on a level with the superior border of the spinous process of the second lumbar vertebra and approximately one inch superior to the level of the upper border of the spinous process of the third lumbar vertebra and three-fourths of an inch below the level of the lower border of the tip of the spinous process of the first lumbar vertebra. They are mid-way between the transverse processes of the second and third lumbar vertebrae just superior to the mamillary processes of the vertebra in question.

The third pair of lumbar nerves in the twenty-second zone supply the bladder, testes, prostate gland, ovaries, uterus, broad ligament, lower part of the small intestines, lower part of peritoneum, appendix, cecum, large intestines, third lumbar vertebra, muscles of the lower part of the abdomen, muscles and tissues of the anterior part of the thigh and the knee joint. If any incoördination exists in any of the structures above mentioned caused by a subluxation of the third lumbar, tender nerves are traceable from the centre to the periphery where the incoördination is manifest or they may be traceable from the periphery to the centre.

If an incoördination obtains in the region of the appendix a tender nerve may be traceable from its point of exit thru the right superior foramen of the third lumbar vertebra in a straight line over the side of the body, branching out over the

region of the appendix. If the incoördination happens to be in the cecum or the ilio-cecal valve, a similar nerve tracing may obtain as in appendicitis. A nerve tracing to the appendix, cecum or ilio-cecal valve does not obtain on the left side.

If an incoördination obtains in the ovaries, tender nerve fibers are traceable from the points of exit superior to the third lumbar vertebra downward and forward to the crest of the ilium, then thru the inguinal region to the ovaries. If the incoördination present affects only one of the ovaries the corresponding nerve would be the only one traceable.

Tender fibers may be traced from their points of exit superior to the third lumbar vertebra on the right and the left of the spinal column around the sides of the body to the crest of the ilium, thence diagonally downward and forward to the symphesis pubes where they become lost. These fibers are traceable only in incoördinations of the bladder. In some cases they may both be tender and in others, only the one on the right or the left may be followed.

Tender nerves are traceable on either the right or the left, downward and forward to the crests of the ilii thru the inguinal region to the pubic crest where they become lost. Such a tracing as this may obtain in incoördinations of the uterus, or broad ligament in the female and the prostate gland in the male.

Fibers in this zone may be traced from their points of exit on the right or the left of the spinal column around the body, superior to the crest of the illii downward thru the inguinal regions, crossing the pubic arch, one on each side of the median line, downward over the scrotum, to the testes.

Since the nerve fibers from this zone supply the muscles of the abdomen, small intestines and large intestines, nerve tracings may be made to any of these tissues wherever an incoördination exists produced by a subluxation of the third lumbar vertebra, thus causing pressure upon the fibers in this zone.

The nerve fibers from the third lumbar zone supply the muscles of the anterior part of the thigh and if any incoördination obtains in these muscles, in either extremity, tender branches are traceable from their points of exit, superior to the third lumbar vertebra, downward over the buttocks, and forward and downward over the anterior part of the thigh, the number of tender branches and their extent being determined by the area affected at the periphery. Similar fibers are traceable from the same point of exit when an incoördination obtains in the region of the knees.

Tender nerve fibers are traceable from their points of exit superior to the third lumbar vetebra, upward along the spinal column about one and one-half inches on either side of the median line to the occipital region. Such a tracing as this obtains very frequently and is very common in occipital headaches.

THE FOURTH LUMBAR VERTEMERE

The fourth lumbar vertebra and the pair of spinal nerves above it comprise the twenty-third vertemere. This pair of nerves make their exit from the spinal column about one-half an inch inferior to the level of the lower border of the tip of the spinous process of the second lumbar vertebra, about one-fourth of an inch below the level of the upper border of the tip of the spinous process of the third lumbar vertebra and approximately one inch superior to the plane passed horizontally thru the upper border of the spinous process of the fourth lumbar vertebra. These nerves are anterior and slightly superior to the mammillary processes of the fourth lumbar vertebra. The first point where tenderness upon pressure is elicited over the course of these nerves, when impinged by a subluxation of the third or fourth lumbar vertebra, is on a level with their exit as above described and about one and one-half inches to either side of the median line.

The parts supplied by the nerves of this zone are the large intestines, bladder, uterus, vagina, prostate gland, rectum,

fourth lumbar vertebra, innominate bones, muscles of the posterior part of the thigh, leg, and foot, the bones of the foot, the tibia, fibula and femur.

Tender nerve fibers to the large intestines, bladder, uterus, vagina, and prostate gland follow the same course as those described in the twenty-second zone, with the exception that their origin is slightly lower.

If any incoördination exists in the region of the innominate bones, femur, tibia, fibula, foot, or muscles of the buttocks, posterior part of the thigh or leg, tender nerves are traceable from their points of exit superior to the fourth lumbar vertebra on the right or the left over the posterior downward to the periphery wherever the incoördination may be manifest and the number of branches traceable at the periphery would determine the extent of the incoördination and the area affected by such incoördination.

In a number of cases tender nerve fibers having their exit superior to the fourth lumbar vertebra are traceable upward along the spinal column to the occipital region similar to those fibers as described in the twenty-third zone.

THE FIFTH LUMBAR VERTEMERE

The fifth lumbar vertebra and the spinal nerves superior to it comprise the twenty-fourth vertemere. This pair of nerves make their exit from the intervertebral foramina on a level with a point midway between the superior and inferior borders of the tip of the spinous process of the fourth lumbar vertebra, about one-half an inch inferior to the lower border of the spine of the third lumbar vertebra and approximately three-fourths of an inch superior to the superior border of the spinous process of the fifth lumbar vertebra.

The first point where tenderness of the nerve resulting from a subluxation of the fourth or fifth lumbar vertebrae, would be found is in a plane passing horizontally thru the centre of the spine of the fourth lumbar vertebra and about one and one-half inches to the right and left of the median line.

The nerves of the twenty-fourth zone supply the rectum, uterus, and buttocks, and are traceable from their points of exit superior to the fifth lumbar vertebra to these structures if any incoördination is manifest.

If the incoördination exists in the uterus, tender nerve fibers are traceable from their points of exit around the sides of the body on the right and left over the crests of the ilii following downward and forward thru the inguinal region and become lost just above the pubic crest.

If the incoördination exists in the muscles of the buttocks tender nerve fibres are found emitting from the foramina superior to the fourth lumbar vertebra and passing downward on either side of the spine, branching over the affected periphery.

A number of the nerve fibers in the lumbar region connect with one another, giving rise to a net work of nerves anatomically known as the lumbar plexus. The names and the distribution of these nerves as well as the parts, the different ones supply, is fully described in the text on Chiropractic Anatomy Vol. IX.

There exists in the lumbar region that arrangement of nerves known as the peripheral system. It is made up of two ganglionated cords one on either side of the median line and anterior to the bodies of the lumbar vertebrae. The nerves of distribution of this peripheral system are deep, and like the deep nerves of the cervical and thoracic regions, may form either the efferent or afferent halves of the cycle. The nerves of this peripheral system are deep and cannot be traced, but since their exits correspond to the superficial traceable nerves and the peripheries they supply are the same as those supplied by the superficial nerves, any subluxation producing pressure upon the superficial fibers will likewise produce pressure upon the deep fibers and any adjustment relieving the pressure upon one will consequently relieve pressure upon the other. These deep nerves may contribute to any existing incoördina-

tion, but to what extent the pelvic organs are supplied by them is not definitely known.

THE SACRAL VERTEMERE

The sacrum with the pair of spinal nerves superior to it and the four pairs of spinal nerves emitting thru the anterior and posterior sacral foramina comprise the twenty-fifth vertemere. The pair of spinal nerves superior to the sacrum make their exit from the spinal column on a level with the middle of the spine of the fifth lumbar vertebra and approximately three-fourths of an inch inferior to the level of the lower border of the tip of the spinous process of the fourth lumbar vertebra. The first point of tenderness may be detected immediately external to the articulating processes of the fifth lumbar vertebra and the sacrum, about one and three-fourths inches to the right and left of the median line.

The second pair of sacral nerves divide within the sacral canal, some of the fibers passing forward thru the first pair of anterior sacral foramina and others backward thru the first pair of posterior sacral foramina. Their point of exit is on a level with the tip of the first rudimentary spinous process of the sacrum, approximately three-fourths of an inch to the right and left of the median line.

The third pair of sacral nerves divide in the canal of the sacrum, some of the fibers passing forward thru the second pair of anterior sacral foramina and others backward thru the second pair of posterior sacral foramina. These fibers make their exit in a plane drawn horizontally thru the lower border of the second rudimentary spine of the sacrum and approximately three-fourths of an inch to the right and left of the median line.

The fourth pair of sacral nerves divide within the sacral canal, some of the fibers passing forward, thru the third pair of anterior sacral foramina and others backward thru the third pair of posterior sacral foramina. They make their exit thru their respective foramina on a level with the lower border of

the third rudimentary spine of the sacrum and approximately one-half an inch to the right and left of the median line.

The fifth pair of sacral nerves divide within the sacral canal, some of the fibers passing forward thru the fourth pair of anterior sacral foramina and others backward thru the fourth pair of posterior sacral foramina. These make their exit from the foramina of the sacrum on a level with the lower border of the fourth rudimentary sacral spine, approximately three-fourths of an inch to the right and left of the median line.

The nerves of the sacrum supply the tissues of the buttocks, muscles and skin covering the sacrum, the sacrum and the articulation of it with the ilii.

Tender nerve fibers are traceable to these different structures outward and downward on the right and left of the sacrum from their points of origin thru any of the posterior sacral foramina.

In some cases tender nerves are traceable from their points of exit thru the posterior sacral foramina to the anus and the external generative organs. In others, nerve fibers, particularly those from the upper part of the sacrum are traceable downward over the buttocks on either side where they branch out over the posterior part of the thigh and the upper posterior part of the leg. In a number of cases these fibers are found to connect with others from the lower lumbar region and in company with these are distributed to the posterior part of the thigh and leg.

Some of the nerve fibers in the sacral region join with one another to form the sacral plexus. Their names and the parts which they supply are thoroughly described in Vol. IX.

THE SACRAL PERIPHERAL SYSTEM

The sacral part of the peripheral nervous system consists of two ganglionated cords situated in front of the sacrum along the inner side of the anterior sacral foramina. Each of these cords has developed upon it four or five small ganglia which are connected by fibres with the sacral spinal nerves.

As a rule, the visceral branches arising from the fourth and fifth sacral nerves are not connected with the ganglionated cord but pass directly to the organs, which they in part supply, within the pelvic cavity. The peripheral fibers of the sacral ganglionated cord are found emitting from the upper three sacral foramina, thence distributed to the rectum, anus, and uterus. These fibers are deep and like the deep branches of the thoracic and lumbar peripheral systems, they probably form the efferent or afferent halves of the cycle.

THE COCCYX VERTEMERE

The coccyx with the two pair of spinal nerves comprise the twenty-sixth vertemere. The upper pair of coccygeal nerves make their exit from the fifth pair of anterior sacral foramina passing from here backward and downward uniting with the posterior fibers of the fifth sacral nerve and also with the fibers of the second coccygeal nerve.

The second pair of coccygeal nerves emerge from the canal of the sacrum passing downward between the cornu of the coccyx and then outward between the first and second segments of the coccyx to join with fibers of the fifth sacral and the first coccygeal nerves.

The fibers of the twenty-sixth zone supply the coccyx and the muscles and skin covering it. Sometimes a number of small branches are traceable forward from their points of exit to the tissues around the anus.

A number of the fibers of the lower sacral and coccygeal nerves form what is anatomically known as the pudendal plexus. The names of these fibers and tissues which they supply are described in Vol. IX.

THE PERIPHERAL COCCYGEAL GANGLION

The last ganglion of the peripheral system is situated anterior to the base of the coccyx. It is the enlargement where the two peripheral cords are joined together and the only branches given off from here are those which supply the coccygeal glands and the ligaments of the coccyx.

SECTION IV.

ABNORMALITIES

EXOSTOSES

An exostosis is a morbid bony outgrowth or enlargement projecting outward from the surface of bone. Exostoses are divided into two main classes, viz: true and false.

TRUE EXOSTOSES

A true exostosis is an enlargement due to the growth or development of new bony tissue. It would ordinarily be called a bony tumor or a homoplastic osteoma because it grows upon a tissue whose consistency is similar or identical with that of the growth itself. True exostoses are the result of disturbances of the function of expansion wherein new bone cells are developed in excessive quantity at a place where not normally needed. They may occur upon any or all bones, the location depending largely upon the disease or condition having an etiologic bearing upon their production.

HOW PRODUCED

Altho the general structure of all exostoses are the same it is well to keep in mind that exostosis is a symptom and therefore may be produced or its production induced by many diseases.

First, it may be the result of developmental defects in which the bone, being abnormally shaped, has a process projecting in a direction that is uncommon thus causing the bone to have an unusual shape. This may be ascertained by the history of the case showing negatively that no disease capable of its production ever existed and yet showing that the deformity existed at birth or was gradually developed early in life with

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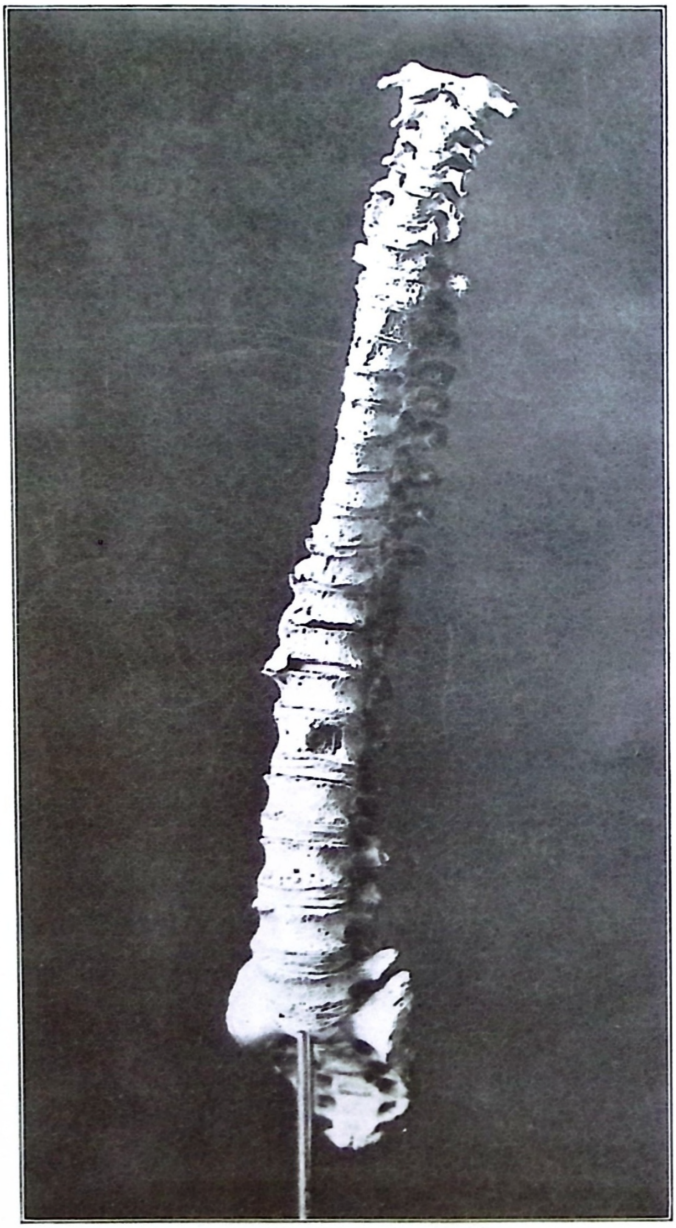

Exostoses Resulting from Spondylitis

ossification of the bone. This is particularly important where the spinous processes of the vertebrae are found to be excessively large having a palpable bulging on one side or the other, such enlargement being a common source of error in the listing of subluxations unless duly taken into consideration. A malformation of this character when situated in the line of the sacral spines often causes them to assume the aspect of a straight bony ridge. When such a bony ridge exists on the sacrum so that the spines are obscure their value as landmarks in locating the posterior superior spine of the ilium is entirely lost.

Second, many exostoses are the result of traumatism. In the healing of a fracture the callous that is thrown out from the fractured surface becomes ossified leaving a distinct, palpable enlargement at that point. This concerns the Chiropractor more particularly when found in the vertebral region as it is apt to mislead one in making an accurate listing of the existing subluxations and at the same time often causes one to list a spinous process that appears to be subluxated but which in reality is an exostotic growth on the spinous process. In cases of curvatures, scars on the spine indicating trauma and unduly peculiar shaped spinous processes, it behooves the Chiropractor to exercise care and judgment in the listing and refer to the spinograph if in any way doubtful.

Third—In older people and those not having had injuries capable of fracturing the bone in question, exostoses are found to be the result of inflammatory changes having occurred in the bones as encountered in gout, arthritis, rheumatism, osteitis and spondylitis. Inasmuch as all of these diseases are inflammatory in character the process of enlargement is a hyperplasia due to proliferation of the bone cells and particularly so when involving the periosteum effecting its ossification. The periosteum is often involved in this manner during the course of pyemia by the pus cells becoming lodged and accumulating in the periosteal vessels, with the result that the bone is enormously enlarged. It is true that such changes

Cut 172

Adaptative Exostosis Strengthening the Spine in Curvature

would be more apt to occur in the extremities and joints where the force of gravity tends to resist normal drainage to some extent, but it is by no means uncommon to find the vertebrae also involved. Proper adjustment given in time during the course of pyemia will prevent such complications developing, but after development it is necessary for the Chiropractor to contend with its existence and exercise care to prevent being misled by it.

In arthritis, rheumatism and gout the production of exostoses is dependent upon inflammatory changes occurring in or around the joints involving the bone and in a proliferative process as described above. But it is also common to find enlargements upon bones, including the spinous processes and transverse processes of the vertebrae, resembling exostoses which are but deposits of organic salts. These deposits cause a similar deformity and interfere with vertebral palpation to the same extent as an exostosis, therefore it is equally important that care be exercised in making an examination of such cases.

Fourth—It is also well to bear in mind that exostoses may be adaptive to slight or severe injuries to the spine, which do not fracture nor dislocate the vertebrae. An acute subluxation of marked degree may be produced which causes a pressure upon a motor nerve leading to the spinal muscles on one side, weakening those muscles to such an extent that they are incapable of properly supporting the spine in its erect position. This alone would be conducive to the production of spinal curvature as the analogous muscles on each side of the spine would not mutually antagonize each other. It is by such opposite action that the body is held erect. Innate, realizing this weakness, quickly seeks to remedy it by throwing out a new growth of normal bone which firmly unites the involved vertebrae, thus arresting the progress and minimizing the extent of the curvature. The bodies of the vertebrae being of a more cancellous structure are more readily involved with exostoses than elsewhere, yet it is not uncommon to find the

transverse processes firmly united by such an exostosis when the tendency of the curvature is more lateral than otherwise. This is due to the fact that Innate is an intelligent force and realizes the fact that by uniting the transverse processes of the vertebrae on the convex side of the curvature the spine will be better enabled to sustain the weight of the upper part of the body in a more nearly erect position. It can be readily seen that an exostosis on the transverse process of a dorsal vertebra would greatly mislead one in making transverse palpation in this region, so we should always guard against such error where lateral curvatures exist and particularly when the spine is unusually stiff and ankylosis suspected. The importance of the spinograph in cases of this kind cannot be over estimated, as malformation of the inaccessible processes leaves that as the only way in which accuracy may be attained.

FALSE EXOSTOSIS

A false exostosis is an enlargement due to the rearrangement of bone normally existing. This rearrangement of bone is the result of a pathological process wherein it becomes soft and because of the height of the body, sustained by the part of the bone affected, it is compressed and therefore must necessarily broaden or bulge as the result. This is seen in connection with most all inflammatory diseases of bone, but more particularly in tuberculosis when affecting the spine so that true and false exostoses may coexist. The true exostosis being the result of bone proliferation induced by heat and the false exostosis the result of bone softening. Both true and false exostoses may effect an ankylosis of two adjacent vertebrae, but more commonly false exostosis will be found to be the cause than true.

False exostoses are found in people of all ages but predominate in young people, for the reason that a very large percentage of such abnormalities results from tuberculosis and this disease predominates in the young. In older people false

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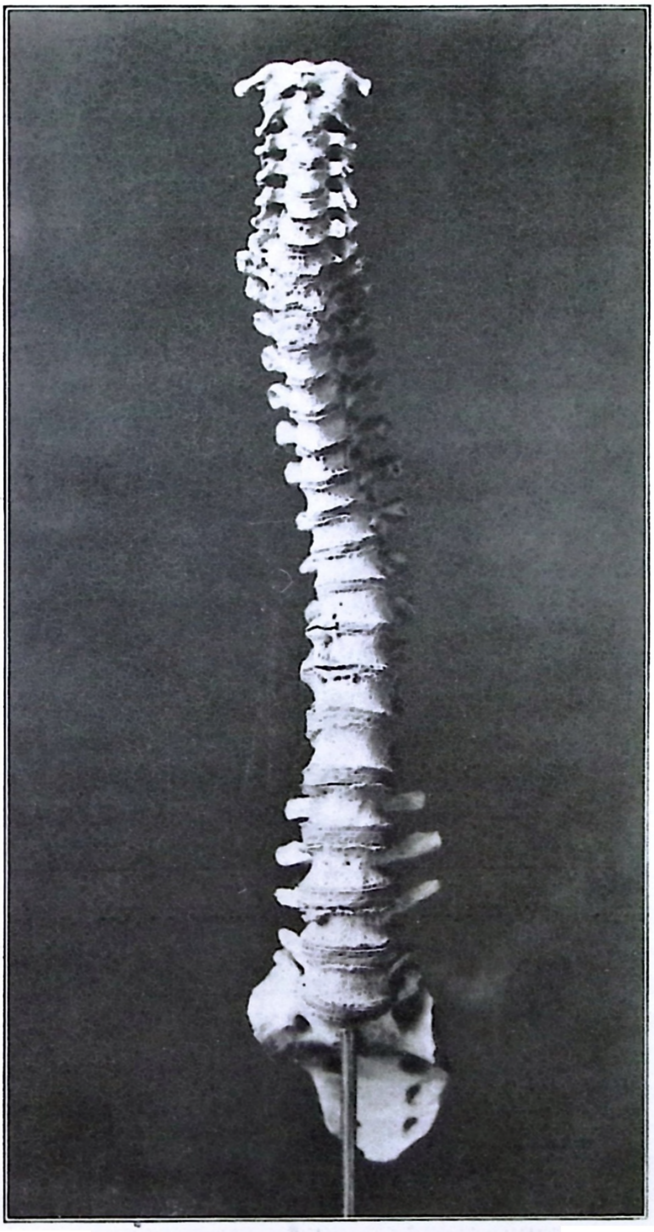

False Exostosis Affecting Ankylosis

exostoses are more apt to be the result of rheumatoid arthritis involving the spine than of arthritis deformans.

False exostoses are much less apt to interfere with vertebral palpation than true exostoses, for the reason that they result from inflammatory processes which rarely affect dense bone like that forming the transverse and spinous processes of the vertebrae.

EFFECT OF ADJUSTMENT UPON EXOSTOSES

After having gained some knowledge as to how exostoses are produced the structural changes having taken place and where most commonly found, let us consider how to adjust when exostoses exist and what we might ordinarily expect in the way of results.

In considering how to adjust when exostoses exist it is well to keep in mind that, inasmuch as they are found in both straight spines and in curvatures, the rules for adjusting would not deviate from those described for abnormal spines or for those used in adjusting a curvature depending upon whether a curvature does or does not exist, excepting where the exostotic growth is so large and in such a position that it interferes with taking the contact as described. If such a condition should be found the method of adjusting would depend entirely upon the finding, the practitioner using his own judgement in determining the contact to be used.

A very large percentage of true exostoses result from developmental defects and from trauma and we could not expect to remove either by adjustments any more than we could correct other congenital or traumatic conditions, but those cases which have more or less directly resulted from disease can be decreased if not entirely removed. A case of recent date having a large osteoma upon the occipital and temporal bones decreased one and one-half inches under a few months' adjustments and, inasmuch as many true exostoses are but osteomas, we could expect the same results.

In false exostoses it is unwise to expect great results for

the reason that the bone has undergone a pathological process, having changed its shape and destroyed its cartilage to such an extent that the latter may have entirely disappeared.

Take as an example a case of Pott's Disease. In the development of this disease the tuberculosis or primary lesions develop in the walls of the blood vessels found in the cancellous bone forming the body of the vertebrae. As they undergo degeneration a considerable portion of the bone surrounding this small lesion is destroyed by the excessive heat and its toxins. This disease being a progressive one, it is but a short time until the cartilaginous intervertebral discs become similarly involved and they, being of soft consistence as compared with bone, are soon entirely destroyed. This permits the vertebrae to come in direct contact with each other and the bone of each to be thoroughly fused, leaving no line of demarcation between what was formerly two distinct vertebrae. This would constitute an ankylosis or abnormal union of two adjacent moveable bones. It would be unwise to adjust such a vertebra with the intention of causing the bones to separate and cartilage to be regrown upon the broken or fractured surfaces. If a finger is amputated by necrosis we cannot expect to grow another by adjustments and no more can we expect to cause cartilage to grow at a place from which it has been entirely removed by disease. Further than this it would be contrary to the laws of nature for cartilage to form upon a fractured surface in such a way that it would permit useful motion of the part. In false exostosis of slight extent, where ankylosis had been produced without the destruction of intervertebral discs, adjustments may be given which will eventually break the exostosis and permit normal movement.

ANKYLOSIS

Ankylosis is an abnormal growing together or uniting of two adjacent articulate bones. Such a condition may be produced in two ways: first, by a true exostosis wherein new bone has been formed in such a manner that it firmly unites the two

bones which were formerly movable. Secondly, it may be produced as a result of inflammation wherein the new bones involved have become soft, having an exudate appear upon their surfaces which upon becoming calcified hardens into bone. Deposits of mineral matter normally found in the body and in excess in lithemic diseases also produce an abnormal union that is commonly called false ankylosis.

HOW DETERMINED

Whenever there is a lack of movement ankylosis may be suspected, but in the extremities in a case having spastic paralysis the undue rigidity may be the result of a spasm in the extensor muscles. In the spinal region the existence of ankylosis is detected by determining whether there is or is not movement between adjacent vertebrae upon bending the spine forward and backward. This is done by placing the three palpating fingers in the interspinous spaces upon the suspected portion of the spine. In the cervical region when the head is moved forward and backward, the spinous processes would normally separate and approximate each other depending upon the direction in which the head is moved. In the dorsal region the fingers are placed as above described and the patient throws the shoulders forward and backward as far as possible without bending at the hips. Repetitions of this movement would cause the spinous processes to separate and approximate each other. If no movement occurs an ankylosis usually exists. The only exception to this is found in elderly people whose intervertebral discs have become thin and whose muscles have become markedly tense as the result of age or disease. In the lumbar region the fingers are placed as previously described and the patient is asked to bend forward as far as possible, at the same time attempting to make the spine as convex posteriorly as possible. If no ankylosis exists the spinous processes will separate with each movement and approximate each other upon straightening the spine. If no movement is detected ankylosis may be suspected and should re-

peated adjustments fail to result in movement of the vertebrae, there is but little doubt of its existence. However, it is well to remember that the lumbar vertebrae are harder to move than those of any other region of the spine and merely because they do not move with an attempted adjustment is a poor excuse for saying they are ankylosed. The Chiropractor should rely on his findings upon examination and the Spinograph in determining the ankylosis and not upon his inability to move the vertebrae.

If upon examination the Chiropractor determines that an ankylosis exists, it is not only well but wise to resort to the Spinograph for the purpose of determining its extent and nature in order that no mistake be made in attempting to break the same.

WHEN NOT TO BREAK

Ankylosis is usually the result of disease or curvature of the spine. They may be of pathological origin and may also develop in connection with morbid disease of the spine, yet they themselves being entirely adaptative or physiological. In a previous example of Pott's disease it was stated that the vertebrae become partially destroyed and deformed so that their bodies become wedge-shaped, and in order to give some support to the spine which has become weakened at this point ankylosis is produced. Should such an ankylosis be broken the support it gives the spine will be lost and the natural tendency would be for the disease to progress and the spine to become weaker. In fact the breaking of the ankylosis would be sufficient to cause physiological inflammation by the friction of its fractured surfaces and to again make the latent tubercles actively inflamed. This would tend to make the disease progress with further destruction of bone rather than being of any material benefit to the patient. In other words when the bone is irreparably damaged by disease, it is unwise to break the ankylosis when there is great possibility of increasing the destructive effect of such disease.

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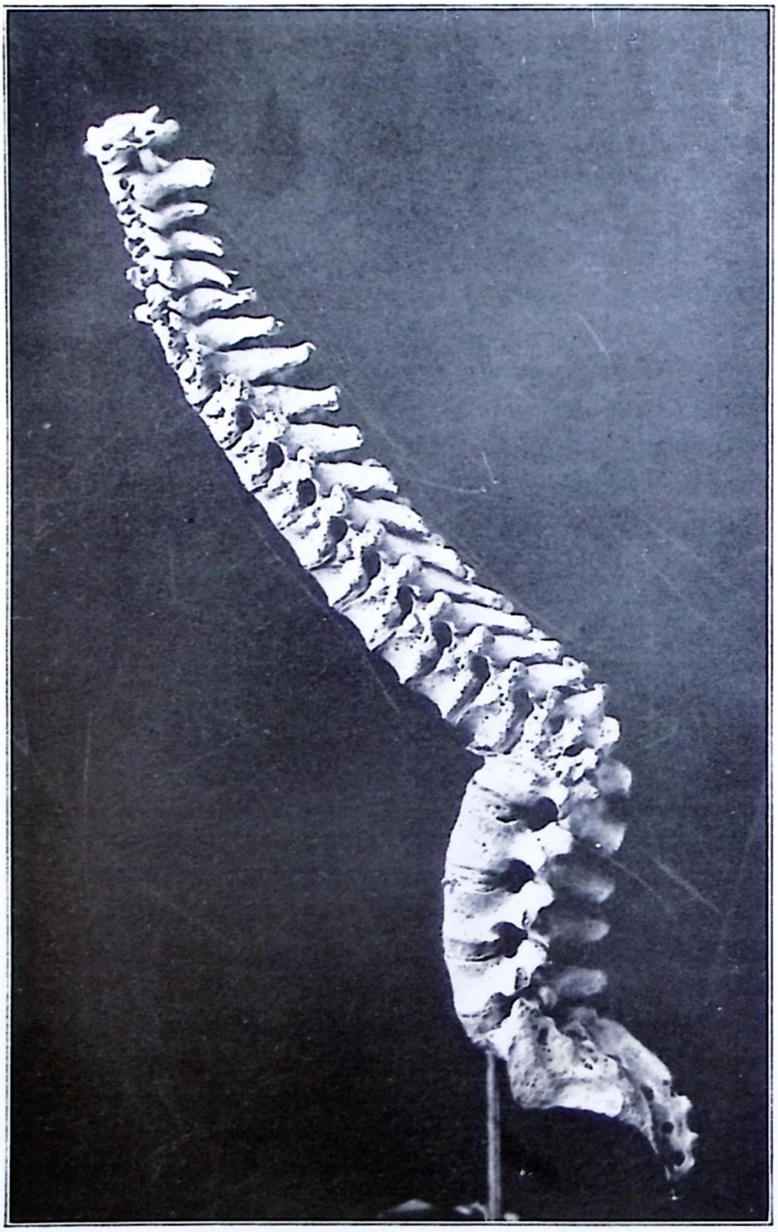

Pott's Disease Showing Exostosis and Ankylosis (a Specimen of the Type Which Should not be Adjusted with the Intent of Breaking the Ankylosis)

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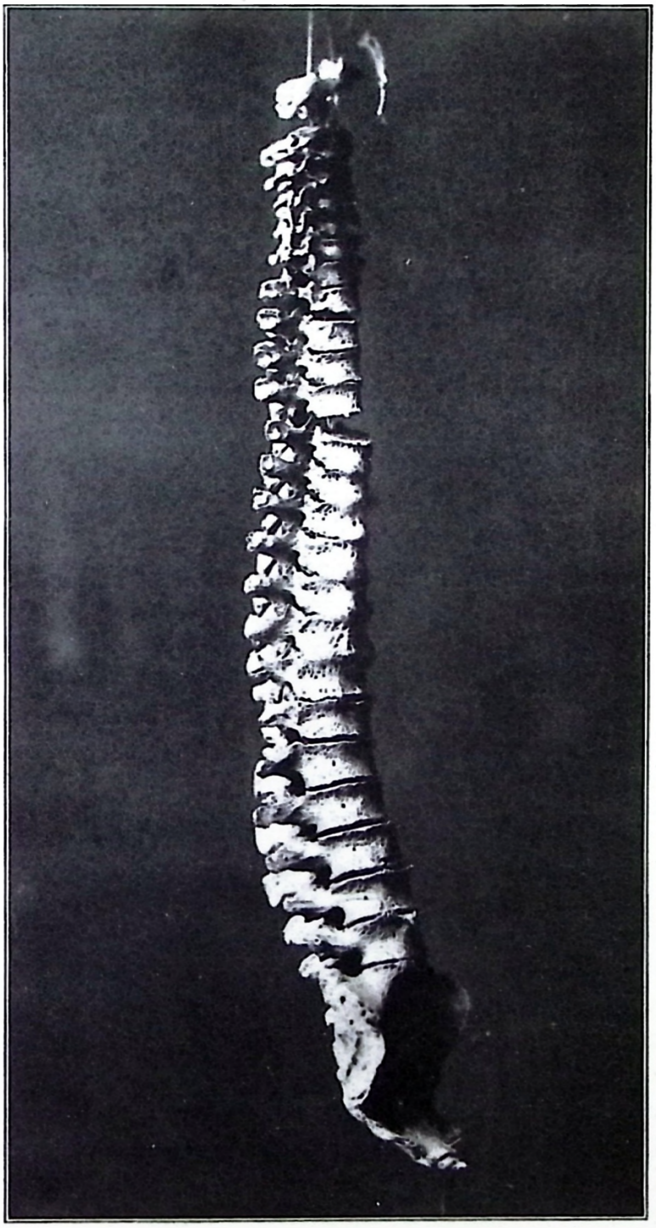

Fusion of the Bodies of the Vertebrae

Occasionally spines are found in which ankylosis is effected by fusion of the bodies of the vertebrae. It is impossible to break such an ankylosis as the fusion makes the point of union as strong as the body of the vertebra itself. Adjusting under such circumstances would only tend to make the patient's back sore without the prospect of any beneficial effect.

In ankylosis following traumatism in which the vertebrae had been fractured and the spinous processes removed by surgery, it is unwise to attempt to break an ankylosis for the reason that considerable of the ankylosis is derived from the callous thrown out from the fractured surface and if broken may cause a further callous to be formed which may project into the neural canal or intervertebral foramen in such a manner that it will exert pressure upon the spinal cord or spinal nerve, thus being injurious instead of beneficial.

In very elderly people whose intervertebral discs have become calcified and whose bones have become unusually hard it would be unwise to break an ankylosis under ordinary circumstances, however, if the nature of the disease from which the patient is seeking relief be such that the results upon the disease would justify the ankylosis being broken it would be wise to make the attempt.

HOW TO BREAK AN ANKYLOSIS

An ankylosis which is the result of disease and itself pathological may be broken as well as one which is adaptative to morbid processes occurring in other parts of the body. In other words any ankylosis may be broken providing the results of such a breaking will not in any way aggravate a preexisting condition. In breaking an ankylosis it is well to keep in mind that whether it be adaptative or the direct result of the disease process itself, the thing to accomplish is the removal of the primary existing condition so that Innate no longer finds the ankylosis necessary. However, a certain amount of force is necessary to actually effect the separation of the

united bones and it is impossible to state in pounds the amount of force to be used. The practitioner must be guided by his knowledge of the human anatomy backed up by the experience in adjusting people of various age, size and make-up. Less force is required in the cervical region than in the dorsal, and more force is required in the lumber region than in the dorsal, while more force is used in adjusting the sacrum and ilii, they being more massive bones and more firmly held together by large ligaments and massive muscles.

Speed is an important essential in adjusting ankylosed vertebrae. It is very unwise to increase to any material extent the amount of force applied by throwing in the weight of the shoulders as this may be injurious to the patient in various ways, particularly so if not carefully placed upon the table in the proper manner or if the patient is so deformed that they are unable to assume the proper position upon the adjusting table.

By increasing the speed slightly, the effectiveness of the adjustment will be increased many fold, therefore, speed, not force is the thing to work for.

The average ankylosis can be broken with ordinary adjustments in a few weeks or months with beneficial effects to the patient, but one cannot too strongly avoid the attempt to break an ankylosis in a few days.

After an ankylosis has once been broken, daily adjustments are essential to prevent the broken surfaces reuniting. Persistent movement of the vertebrae soon causes the callous to be destroyed and the fractured surface to become smooth forming a false articulation like that occurring in a fractured bone which has failed to unite. This will permit free movement of the spine without pain and at the same time will allow the vertebrae to be replaced relieving nerve pressure and the restoration of mental impulses to an affected organ.

The breaking of an ankylosis is somewhat painful to the patient who will often beg to be excused for a few days until this soreness leaves, so it is highly important that the Chiro-

practor explain to the patient what is being done and the beneficial results that will follow in order that they will avoid delays in accomplishing the desired end. If they were to rest until the soreness disappeared they would have to go thru the same process again in having the ankylosis rebroken before the desired results could be obtained. When the ankylosis has once been broken the amount of force to move the vertebrae may be slightly diminished or at least just enough force to move the vertebrae should be used thus causing the patient the least possible inconvenience.

QUESTIONS FOR STUDY

1. What is an exostosis?
2. Into what two classes are exostoses divided? Define each.
3. State four ways in which exostoses may be produced. Describe each.
4. In what way may exostoses mislead the practitioner?
5. State two ways in which exostoses can be detected.
6. Why are exostoses more common on the bodies of the vertebrae?
7. In what way may exostoses interfere with adjustment?
8. What contact is preferable in adjusting vertebrae having exostoses?
9. To what extent can exostoses be removed?
10. Why is it more difficult to remove false exostoses?
11. Under what circumstances should we avoid adjusting where there is exostosis?
12. What is an ankylosis? How classified?
13. Describe the procedure of determining the existence of ankylosis in each of the three spinal regions.
14. Describe two ways in which ankylosis is produced.
15. State a condition commonly mistaken for ankylosis.

16. Discuss the value of spinograph for ankylosis.

17. Under what conditions should ankylosis not be broken?

18. If broken what would be the result?

19. What ankyloses cannot be broken?

20. Why does calcification of the intervertebral discs interfere with adjustment?

21. How should ankyloses be broken?

22. How much time should be used in breaking an ankylosis?

23. What is the value of speed in breaking an ankylosis?

24. Why is it unwise to use great force on ankylosed spine?

25. Why are regular and frequent adjustments necessary after an ankylosis has been broken?

26. In what part of the spine is much force essential in adjusting?

27. In what part of the spine should least force be used?

28. How can the practitioner judge the amount of force to be used?

29. Does the amount of force always vary according to the size of the patient?

30. Explain the above question.

FORM AND FLEXIBILITY OF THE NORMAL SPINE

The vertebral column before birth generally forms a gradual single curve, the convexity of which is directed backward which is due to its position in the uterus. This position is more or less retained after birth for several months. During these early months if the child is kept in the dorsal posture upon a bed that is firm, the posteriority of the curve will be greatly diminished. Beginning about the fourth month when the child starts lifting and turning the head a pronounced change in the shape of the spine in the cervical region will be observed. At this time the cervical part of the spine changes

from its original kyphotic condition to the opposite, an anterior curve whose concavity is posterior.

The next important change occurring in the shape of the spine develops when the child learns to stand on its feet and attempts to walk. Previous to this time the spinal muscles are but little used. Now, however, they become active in sustaining the spine in its erect posture and in permitting bending in various directions. The muscles arising from the sacrum and innominate bones and attached at the lower part of the dorsal region, in contracting, tend to force the posterior curve in the lumbar region forward, until it is ultimately transformed into a pronounced anterior curve having its convexity anterior. As a result of this change the vertebral column, which was originally an even posterior curve, now presents an anterior curve in the cervical region and an anterior curve in the lumbar region while the posterior curve still remains in the dorsal region. The sacrum, because of its formation remains in the line of a posterior curve, thus, it is said that the spine has four primary curves which gives it a long S or buggy spring shape which is found in adults having erect and faultless carriage.

Not only do the spinal ligaments play an important part in holding the vertebrae of the spine in the proper relation to each other and in retaining the spine in a normal position but it is highly important that the various groups of spinal muscles act in continuous and harmonious co-operation. The posterior muscles which are located on both sides of the spine tend to maintain and increase the anterior curve in the lumbar region while the abdominal muscles tend to maintain and increase the posterior curve in the dorsal region. Thus, it will be seen that there are groups of muscles whose action continuously antagonizes that of each other.

The normal posture of the spine is not entirely dependent upon the form of the spine, but it is caused to vary according to the position of the pelvis, due to the fact that the connection of the pelvis with the spine by means of the sacro-iliac articu-

lation is very rigid. Therefore it can be readily seen that should the sacrum be so situated that its base is unusually far anterior it will be natural that the anterior curve in the lumbar region be very great in order that the fifth lumbar normally articulate with the sacrum and the other lumbar vertebrae articulate with those directly below. If the sacrum should so articulate with the ilii that it is nearly vertical or that its base is posterior, it would be natural for the anterior curve in the lumbar region to be decreased and the spine, in such a case, would be more nearly straight.

SPINAL CURVATURES

The spinal column normally contains four curves, an anterior in the cervical and lumbar region, and a posterior in the dorsal and sacral region. Any abnormal increase of a normal curve or other deviation of several adjacent vertebrae constitutes a curvature. Curvatures are divided into three groups, namely kyphosis, scoliosis and lordosis. In many instances a combination of two may exist in the same part of the spine and at the same time the involved vertebrae be rotated upon their axis constituting what is commonly called a rotation.

KYPHOSIS

A kyphosis is a posterior curvature of the spinal column and can usually be detected by inspection. In those cases having growths of considerable size in the spinal region it may be necessary to employ vertebral palpation for the purpose of ascertaining whether or not the unusual convexity is a kyphosis or tumerous enlargement. This is especially true in those cases having lipomas. In the case of a lipoma it will be found that the enlargement will fluctuate under pressure, is of soft consistence in comparison with that of bone and is distinctly lobulated. If the posterior convexity in the spinal region be a kyphosis palpation will reveal the tips of the spinous processes of the vertebrae lying immediately beneath the skin.

CAUSE OF KYPHOSIS

Kyphosis, and in fact all spinal curvatures may be divided into two general classes primary and symptomatic, the latter frequently being called secondary or adaptative. In general let it be stated that all curvatures, whether primary or symptomatic, are caused by a single vertebral subluxation as has been amply demonstrated by the gratifying results of adjustment in both forms.

A primary kyphosis is a gradual or angular posterior convexity of several adjacent vertebrae produced by an abnormal condition or disease of the vertebrae at the part of the spine involved. Preceeding its development a single vertebra is subluxated posteriorly, or posteriorly with laterality, superiority or inferiority. This abnormal position of the vertebra causes uneven distribution of the weight of the body sustained by the vertebra upon its adjacent intervertebral disc. The intervertebral disc, being composed of cartilage, is much softer than bone and therefore more readily compressed by the added weight thrown upon it. The articular processes, altho not in proper apposition, still sustain considerable of the weight brought to bear on the vertebra posteriorly, so that the intervertebral discs are more compressed anteriorly causing them to become wedge-shaped. Future jars, twists, lifts and strains would be more apt to intensify the degree of this primary subluxation rather than subluxate another vertebra which is in normal position. Each time the degree of this subluxation is increased, more weight will be brought to bear upon the cartilage until ultimately it will become very thin or entirely disappear. When such is the case we have a decided kyphosis and in the development of such a kyphosis, usually several vertebrae and their intervertebral discs are involved as above described, altho usually the one at the apex of the kyphosis is the primary subluxation responsible for its development.

The primary subluxation responsible for a kyphosis not only tends to cause compression of the intervertebral discs by

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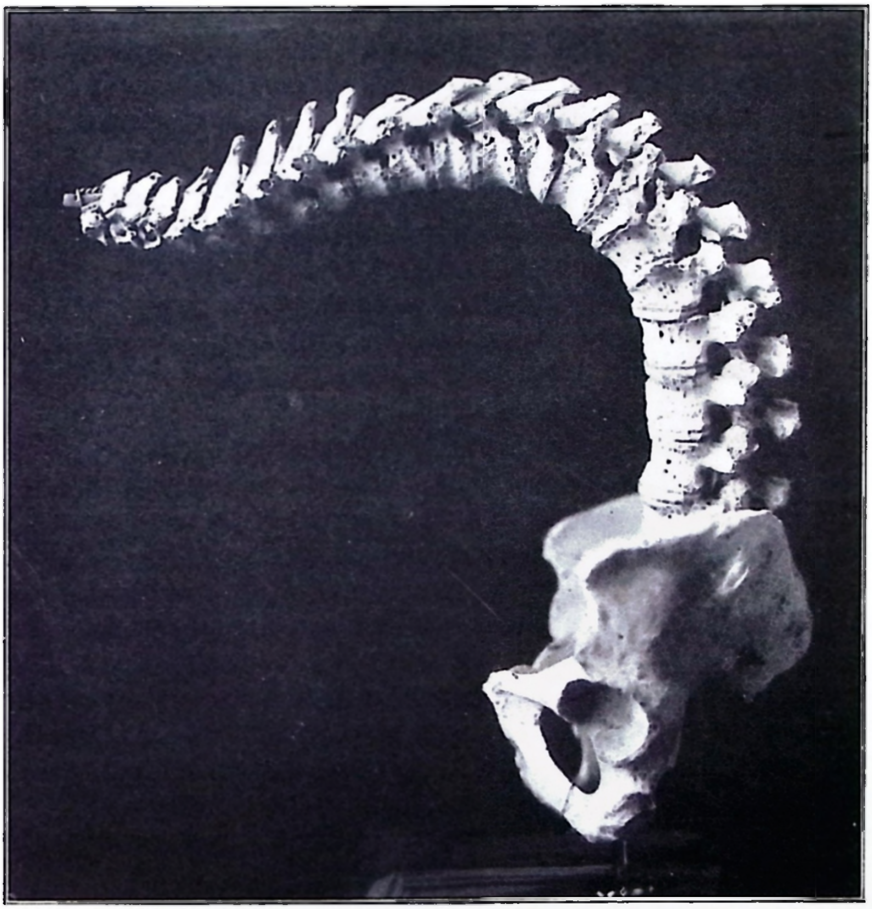

Kyphosis in the Dorsal Region Showing Compression of the Inter-Vertebral Discs

its abnormal position but also may produce pressure upon a motor nerve supplying the adjacent spinal muscles to such an extent that it diminishes the supply of motor impulses to those muscles. This lack of motor impulse causes the muscles to lose their normal tonicity so that they become elongated and fail to give to the spine the support they should have, in maintaining it erect. If the muscles on both sides of the spine are equally affected by this muscular weakness the upper part of the body will be bent straight forward and the vertebra extend backward as in ordinary kyphosis, but if the muscles of one side are weakened to a greater extent than those of the other, that weak side will be favored and the patient will adaptatively assume a position which will cause the spine to not only bend backward but also to be rotated, thus producing a combined kyphosis and scoliosis. Muscular weakness is an important factor in all spinal curvatures and is one that should not be overlooked.

Careful examination will usually disclose the fact that the primary subluxation at the apex of the kyphosis is the cause for such muscular weakness.

Secondly, primary kyphoses which are more or less gradual and regular in their convexity existing in elderly people are the result of retrogressive changes having occurred in the intervertebral cartilage and the assuming of a stooped position while employed at their daily occupation for many years. This will be seen in elderly shoemakers, gardeners and other laborers whose work would cause them to do much bending. Kyphoses of this kind more commonly occur in the upper dorsal region and rarely interfere with movements of the spine to the same extent as those produced in other ways. A very gradual kyphosis of this character rarely produces nerve or cord pressure as is proven by their existence in many people enjoying excellent health.

Thirdly, one of the most common causes of an acute, angular, primary kyphosis is tubercular spondylitis, otherwise known as Pott's disease. Although this disease may be found

in people of all ages, it predominates in the young. The primary lesions of tuberculosis have their origin in the walls of the arterioles supplying the cancellous portion of the body of the vertebra, hence the spinous, articular and transverse processes are seldom affected, they being composed of dense or compact bone. The inflammatory changes transpiring in the tubercles gradually, but progressively, bring about a softening of both the intervertebral cartilage and the body of the affected vertebrae, usually three or four adjacent vertebrae being involved. As a general rule, the centrum of the vertebra originally affected by the disease is deformed to a greater extent by its destructive process than are those above and below it. It is this fact that causes the kyphosis to be more acute or angular than those produced in other ways.

Occasionally the body of the vertebra originally affected is entirely destroyed, so that the one superior and inferior to it come in direct contact at their anterior extremity. It can be readily seen that adaptative changes would have to occur in the spinal ligaments and muscles in order that the spine may be maintained erect and capable of supporting the weight of the body when in the erect posture. This is done and at the same time that the destructive process is going on, Innate takes further precaution in preventing disability by forming extensive exostoses laterally and anteriorly upon the vertebrae less affected, to such an extent that they are firmly held together by the ankylosis. This ankylosis not only enables the spine to sustain the weight it supports, but also minimizes the friction that would ordinarily be induced by movement. Friction tends to aggravate inflammation and if no means were taken to diminish movement the destruction of the bone would be consummated much sooner than when such movement is prevented. Therefore, it can be seen that the ankylosis serves two purposes: first, it strengthens the spine, and second, it prolongs life by removing that friction which would ordinarily aggravate the inflammation and hasten complete destruction of the affected vertebrae.

Cut 177

Posterior View of Early Pott's Disease Showing Abscess

INDICATIONS OF POTTS DISEASE

Inspection of the vertebral region reveals an acute angular kyphosis most commonly located in the lower dorsal or lumbar region, the overlying skin of which is red and somewhat shiny as it is drawn tense over the prominent vertebrae. Palpation will show that the cutaneous surface is hot at this point and that the spine is unusually tender. The patient walks slowly and carefully, avoiding all jars which would bear upon the spine at this point. Bending and rotating the spine is likewise avoided. In walking, the feet are not raised high; the patient not only takes short steps, but moves the feet along close to the ground in a shuffling manner. When sitting or standing it is not uncommon for the arms to be placed upon some support which would tend to sustain part of the weight of the upper part of the body, thus relieving the diseased spine from its pressure.

The pus that forms from this necrotic destruction may be gradually absorbed or may accumulate in the bulk of the psoas muscle, forming what is commonly known as a psoas abscess. When such a condition develops the pain is not only severe and throbbing, but the temperature is considerably elevated and irregular. During this stage, afternoon fever with night sweats are very common. A psoas abscess usually drains by means of a fistulous canal, extending downward through the muscular fascia opening at its lower extremity in the upper and front part of the thigh, or the pus may perforate posteriorly forming a permanent sinus slightly to one side of the spine. When the pus is drained from the abscess in this manner it is not uncommon for new abscesses to form at other points in the body, below the original abscess and in the path of the drainage canal.

The assumption of a habitual attitude, characterized by an increased posterior, bending of the spine that is maintained for long periods at a time is very conducive to the production of kyphosis, due to greater weight being borne by the anterior part of the intervertebral cartilage. As previously mentioned,

this commonly occurs in connection with occupations which demand much stooping, but in the young, aside from faulty habits, it is greatly predisposed by rickets, because of the deficiency of mineral salts in the bones. The term rachitic kyphosis has been commonly used to designate the underlying cause of such a kyphosis.

A characteristic symptom of this form is a marked posterior projection of the lower dorsal and lumbar vertebrae which is explained as being due to the sitting posture in bed at too early a period in life. Extension of the legs at the knee-joint, together with flexion of the thigh, force the muscles to contract and to rotate the pelvis backward in such a manner as to decrease the inclination of the sacrum and to change the forward position of its base into a more posterior direction. The lumbar region must necessarily so change its line of curve in adapting itself to this unnatural position of the sacrum, that it bends backward rather than forward. The carrying of a rachitic child on the arm, so that its back is not well supported, aggravates the disposition to kyphosis. It should not be forgotten that faulty arrangement of the bed with too many pillows and a soft feather mattress instead of a hard, even one, may result in an increased kyphosis of the soft rachitic vertebral column.

The **round shoulders** of school children which occur during the school period is a very common form of kyphosis developing in the middle dorsal region, having as its apex the eighth or ninth dorsal vertebra. Primarily a subluxation in this part of the spine is the cause, but in order to hold the spine in such a position as to conform with the physiological curves, a continuous action of the erector spinae, flexor and extensor muscles of the hips is essential. The constant muscular activity thus employed becomes tiresome in a short time and the child seeks to fit the spine by positive contraction of muscles and checking of ligaments. This is done by drooping the shoulders forward in such a way that the dorsal and lumbar portions of the spine assume a totally kyphotic curve and

the ligaments attached to the posterior aspect of the spine act in apposition, relieving the muscle of a large part of its effort in holding the spine in shape. At the same time, the intervertebral cartilages are pressed together at the front of the spine, producing a rigidity which diminishes its normal movement. This attitude gradually grows and may become permanent as the passive contraction of the ligaments act as a substitute for the tiring muscles which undergo partial atrophy.

The fact that the spinal muscles become tired and weakened in some individuals, yet by no means all, is explained by the existence of a single subluxation existing near the apex or center of the kyphosis which impinges a motor nerve or motor nerves supplying these muscles. Such pressure would cause the muscle to lose its tonicity and weaken so that the weight of the upper part of the body would naturally tend toward assuming the posture above described.

THE ADJUSTMENT OF KYPHOSIS

In determining how to adjust a kyphosis it is absolutely essential that we first know whether the kyphosis is primary or symptomatic, and exactly how it has been produced. The reason for this is clear. Should the case in question be a kyphosis in the dorsal or lumbar region, due to disease of the cervical cord, it would be the height of folly to attempt its removal by adjusting the kyphosis itself, because the organic disease of which it is but a symptom could be rectified by cervical adjustments only. Therefore, as a first rule in the adjustment of kyphoses, let it be said that a careful examination and case-history be made, embodying all symptoms from the beginning of the condition, up to and including the present time. After these symptoms have been properly classified, it is possible to arrive at a conclusion as to the nature of the disease or case at hand, and the adjustment can then be made according to the zone in which the effect is situated. If it is determined that the kyphosis is symptomatic, physiological or adaptative, it should be entirely disregarded in making the

adjustment, as the causative subluxation may lie in the kyphosis or be situated far distant from it, as in the above example.

ADJUSTMENT OF PRIMARY KYPHOSES

Inasmuch as a primary kyphosis is not the result adaptatively or otherwise of a disease in any other part of the body, but it is the disease or abnormality itself, the sole object in adjusting would be the rectifying of the curvature. Furthermore, every abnormal condition in the body which includes the spine itself, has a primary cause, therefore it is very essential that the causative subluxation in the kyphosis be selected for adjustment. Careful study, long experience and manifold experiment have all proven that the vertebra at the apex of the kyphoses is the one originally subluxated and causes the tendency of the spine to bend backward. Common sense further tells us that when the sole object is the straightening of the curvature, it can best be done by selecting for adjustment that vertebra or those vertebrae which are most posterior.

When the kyphoses is long and gradual, even though it may have a single causative subluxation, it may be more rapidly corrected by adjusting not only the most posterior vertebra at its apex, but also selecting for adjustment one or two additional posterior vertebra in the kyphosis, because they may have an etiological bearing on the kyphosis in that after the kyphosis was started, their posteriority may have been increased to such an extent that they produced pressure upon motor nerves supplying the spinal muscles and by so doing weaken these muscles which would permit an increase in the degree of the curvature. If more than one vertebra is selected for adjustment, it is usually best to select but one on each side of the apex, yet some distance from it. When the vertebrae have once been selected they should be adjusted regularly, without daily variations, until they cease to be the most prominent vertebrae in the kyphosis. In this way the curvature will be gradually diminished and eventually straight-

ened, or nearly so, depending upon the structural changes having taken place in the body of the vertebrae.

ALTERNATE ADJUSTMENT OF THE VERTEBRAE

It is very unwise to adjust adjacent vertebrae alternately, with the exception of reducing or correcting a kyphosis, for the reason that alternate adjustment of adjacent vertebrae in a kyphosis prevents the restoration of their normal relationship. For example, if we adjust the seventh dorsal today we move it towards its normal relation with the eighth, conceding that it is posterior to begin with, but if we adjust the eighth tomorrow, we will then have established the same relationship between the seventh and eighth that existed before the first adjustment.

EFFECT OF ADJUSTMENT

Each time the vertebra is adjusted it is moved in the direction of its normal position, but because of a change in the shape of the intervertebral cartilage it has adapted itself to the abnormal position to such an extent that it tends to return to that adnormal position. The spinal ligaments have also adapted themselves to the abnormal position of the vertebra thus serving to retard its return to its normal position. Repeated adjustment of a vertebra tends to stretch the shortened ligaments and gradually lessen their tendency of resisting its replacement.

Every time the vertebra is moved in the direction of its normal position the pressure upon spinal nerves emitting from the adjacent intervertebral foramina is decreased, thereby permitting the normal flow of motor impulses to the adjacent spinal muscles. As the spinal muscles are strengthened they are better able to support the spine in its normal shape, and thus also lessen the aptitude of the vertebra returning to its abnormal position.

Every time the vertebra is adjusted, friction is produced by its articular surfaces moving upon one another. There is

also more or less friction upon the intervertebral cartilage. This friction induces physiological excessive heat which in turn produces proliferation of cartilage. In this way the cartilage is caused to thicken and assume its normal shape, thus abolishing the tendency of the vertebrae to move back after adjustment.

Therefore, repeated adjusting of the vertebrae will cause the shortened ligaments to stretch, the relaxed muscles to contract and the compressed cartilage to thicken until ultimately the vertebra readily remains where placed, and when placed, restores the normal contour of the spine. It should readily be seen that such a process as the straightening of a kyphosis cannot be accomplished in a few days or weeks as it is necessary for Nature to bring about changes in the structure of the spine that, as a rule, requires many months.

SELECTION OF VERTEBRA TO ADJUST

It has been previously stated that in adjusting a spine having a kyphosis for the removal of such kyphosis that it can be best accomplished by selecting the vertebra which is most posterior at the apex of the kyphosis, but the average practitioner meets many cases in which the patient is suffering incoördination in a zone not in or adjacent to that of the apex of the kyphosis. Even though a kyphosis exists it is possible to have a vertebral subluxation in any part of such kyphosis capable of causing disease and if upon careful examination it is determined that such subluxation is the cause of the incoördination, that particular vertebra should be adjusted, disregarding the kyphosis and the former rule for adjusting the same.

No definite rule can be laid down governing the selection of vertebra to be adjusted in a kyphosis due to the fact that we meet many unusual conditions, no two of which may be similar and a method of adjusting one might not be adaptable in adjusting another. In these unusual cases it is essential that the Chiropractor not only use his judgment and resourceful-

liosis that are readily amenable to adjustments, as that occur-
to properly detect the irregularities that he will certainly meet.

THE BEST CONTACT

The question is often asked, "is a spinous process or transverse process contact better in adjusting a kyphosis?" The answer and reason is readily seen if we but carefully study the act we wish accomplished. In speaking of a kyphosis, we are taking it for granted that it is a kyphosis, not a rotation nor scoliosis, which are described in a later section. The thing to be accomplished is to drive the vertebra anterior. This could not be accomplished by a single transverse adjustment, as such an adjustment would rotate the vertebra and we do not wish to rotate the vertebra out of its proper alignment in attempting to straighten the spine.

A double transverse contact on the two transverse processes of the vertebra at the apex might serve to move the vertebra in the proper direction, but owing to the fact that much speed is not attainable in transverse adjusting, this contact is less effective than the spinous process contact. The vertebrae in a kyphosis, as a rule, move hard because the intervertebral discs are compressed and wedge-shaped, therefore, speed in the adjustic move is of great value as the thrust having great speed is more effective than that having great force, but slow. Furthermore, a great many spines having kyphoses are found to be ankylosed, and as has been previously explained, speed is of vital importance in breaking an ankylosis. The advisable contact in adjusting all kypotic conditions is on the spinous process of the vertebra to be adjusted and it should not be forgotten that the adjustive move be given with all speed possible.

When the vertebrae in a kyphosis are also out of lateral alignment or rotated, they should then be adjusted as described under the heading rotation or scoliosis.

DIRECTION OF DRIVE

In the adjustment of a kyphosis the direction of drive depends upon the direction in which the vertebra is subluxated. In all cases posteriority is to be emphasized, but should the vertebra selected for adjustment be subluxated laterally and superiorly as well as posteriorly, all directions should be taken into consideration and the adjustment given as for P. L. S. subluxation. The toggle has the same value in adjusting kyphoses that it has in adjusting spines having no curvature and may be briefly stated that whenever the vertebra is a three-lettered subluxation, it is advisable to use the toggle.

GENERAL PROGNOSIS OF KYPHOSES

The prognosis of an individual case in any disease is not only determined by the nature of disease, but upon many factors such as vitality, mode of living, moveability of the vertebrae and more particularly the damage done by the disease and the extent to which it is capable of being repaired. Such a prognosis can only be made after careful examination and study of the particular case in question, so it is possible to state here nothing more than a general prognosis, and this must be made guardedly.

In the young and in the early stages before the intervertebral cartilage has become destroyed the prognosis is favorable, although considerable time must be allowed in which the cartilage may thicken and adapt itself to the new and more normal position of the vertebrae. In older cases where no ankylosis exists and where the spinograph shows intervertebral cartilage, the prognosis is still favorable even though the deformity be of many years duration. In cases of any age having ankylosed vertebra in the curvature more time would be required in effecting recovery due to the fact that the ankylosis must be broken. Those cases in which the intervertebral cartilage has been entirely disorganized and the bodies of the vertebrae fused together, whether the result of Pott's disease

or not, have little or no chance of benefit so far as straightening the spine is concerned.

In all cases of kyphosis where the vertebrae are not palpably movable, it is highly unwise to make any prognosis until after a spinograph has been made in order that the true nature of the condition may be seen.

QUESTIONS FOR STUDY

1. What is the shape of the normal spine in the foetus?
2. When and where does the first physiological curve take place?
3. At what age do the other curves appear?
4. Locate and describe the four primary curves of the spine.
5. What force maintains the spine in its normal erect posture?
6. In what way does the pelvis influence the shape of the spine?
7. To what is the absence of the primary lumbar curve due?
8. What is a curvature?
9. Name the curvatures of the spine.
10. What curvatures may be combined?
11. What is a kyphosis?
12. Differentiate kyphosis from spinal tumor.
13. Into what two general classes are kyphoses divided?
14. What is the primary cause of kyphosis?
15. Explain how the primary vertebral subluxation causes kyphosis.
16. What cartilaginous changes take place?
17. What muscular changes take place?
18. What ligamentous changes take place?
19. In what way or ways are kyphoses intensified?
20. In what parts of the spine are kyphoses most common? Why?
21. In what way do occupations have an etiological bearing upon the production of kyphoses?

22. Where is the primary subluxation most commonly located?
23. How is it determined?
24. In what class of individuals are gradual kyphoses most common?
25. What is the most common organic cause of acute angular kyphosis?
26. Describe the structural changes of Pott's disease.
27. What part of the vertebra is affected by Pott's disease? Why?
28. What parts are rarely affected? Why?
29. What adaptative change takes place when the body of a vertebra is totally destroyed?
30. How can destruction of the vertebral body be determined?
31. What form of ankylosis occurs in Pott's disease?
32. How does Pott's disease affect movement of the trunk?
33. Describe the symptoms of Pott's disease.
34. What is a psoas abscess and how formed?
35. How is such an abscess drained?
36. What is a fistula?
37. Where do fistulae resulting from Pott's disease usually appear?
38. In what way does a psoas abscess affect the general health of the patient?
39. How can a habit kyphosis be explained Chiropractically?
40. Why are they more apt to develop in youth than in old age?
41. What is a rachitic kyphosis?
42. State the symptoms of rachitic kyphosis.
43. State three things that are conducive to rachitic kyphoses in children having rickets.
44. To what are round shoulders due? Explain.
45. Explain as to a patient the rectification of round shoulders.
46. What is a symptomatic kyphosis?
47. Where should adjustments be given to rectify symptomatic kyphoses?

48. Under what circumstance would you adjust vertebrae in a symptomatic kyphosis?
49. Give an example.
50. What is the proper manner to list a primary kyphosis?
51. What vertebra in a primary kyphosis should be selected for adjustment?
52. Under what circumstance would you adjust more than one vertebra?
53. Why is it unwise to adjust alternate vertebrae in a kyphosis?
54. Explain the effect of adjustments upon kyphoses.
55. What three changes necessarily take place before the spine becomes entirely straight?
56. What contact should be used in adjusting a kyphosis?
57. Under what circumstances would transverse adjustments be permissable?
58. What is the direction of drive in adjusting a kyphosis?
59. Explain the value of speed in adjusting kyphoses?
60. Discuss the prognosis of kyphosis under adjustments.

SCOLIOSIS

Definition:—Scoliosis is a permanent lateral deviation of the spine. In detecting a true scoliosis it is important to avoid mistaking an uncertainty of attitude for the same. It has been observed in children under ten years of age that the spine forms a lateral curvature, because of an inability to control their muscular action sufficiently to hold their spine, which is still very flexible, straight. Repeated observation and digital examination prove that many curves taken to be scoliosis at first inspection are due to this uncertainty of attitude. In a true scoliosis the spine always presents a permanent curvature and although the degree may vary with time its character and location remain the same. When the spine presents a single curvature involving most of the vertebrae it is termed a right or left total scoliosis. It is doubtful whether such curvatures

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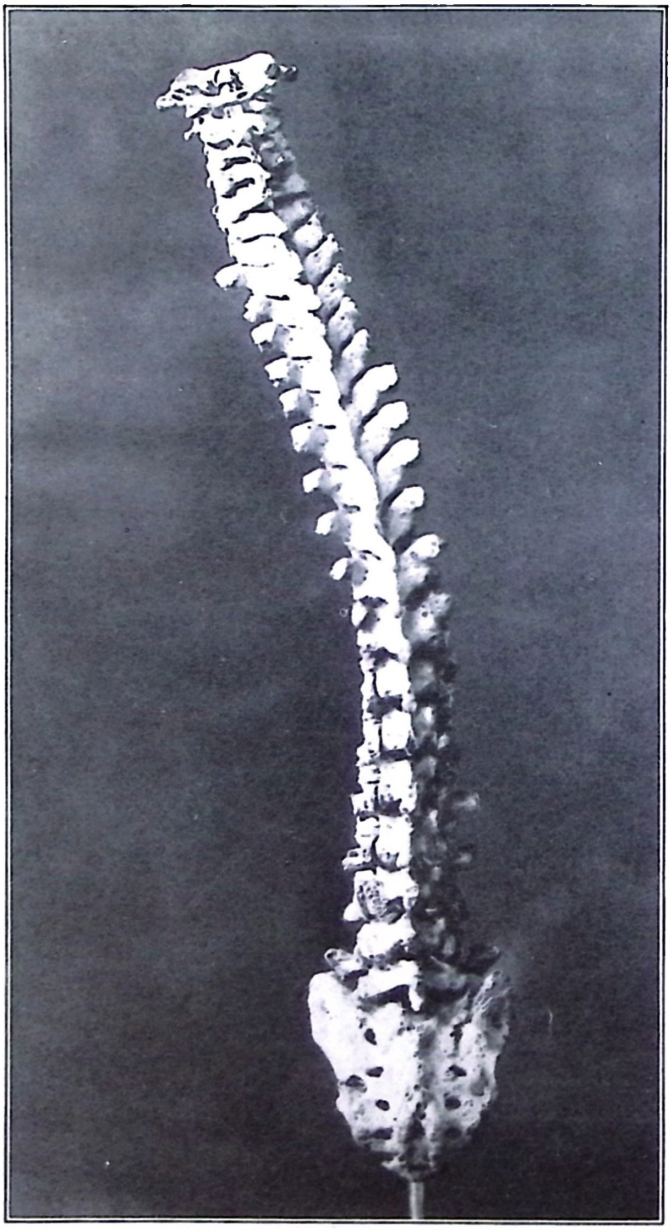

Total Right Scoliosis

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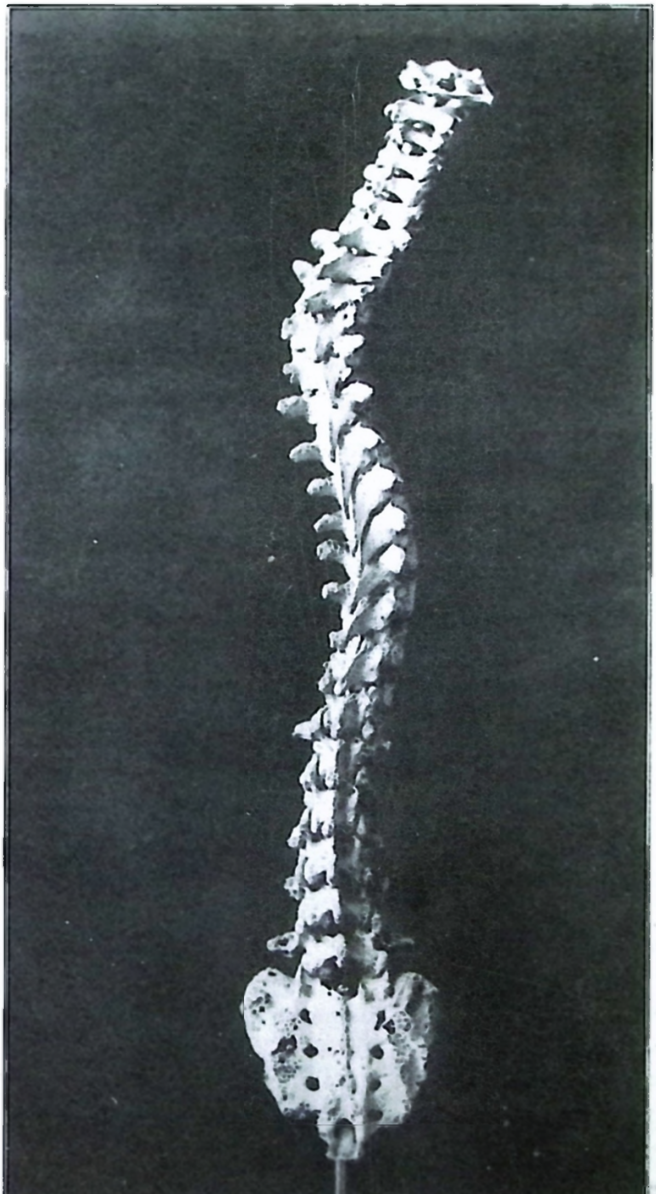


Primary and Compensatory Scolioses

are permanent, as later in life compensatory curvatures usually develop at the upper or lower end of the primary curvature, the object of such compensation being the maintaining of the center of the equilibrium perpendicular. It is estimated that total scolioses do not constitute more than ten per cent of the lateral spinal deviations and the majority of those existing are found in children from four to eight years of age.

How Named:—When the scoliosis is confined to one region of the spine, it is named in accordance with that region such as **cervical, dorsal** or **lumbar** scoliosis, and when it embraces more than one region is named accordingly as **dorso-lumbar** or **dorso-cervical.**

Compensatory Scoliosis:—Not less than ninety per cent of scolioses have one or two compensatory scoliosis just above or below the region of the spine that is affected by the primary scoliosis. The compensatory curvature is always directed toward the opposite side from the primary scoliosis.

EFFECT OF SCOLIOSIS UPON THE TRUNK

It is evident that a curvature of the spine changes the lateral outline of the trunk. The side of the trunk corresponding to the convexity of the curvature projects laterally, while the opposite side recedes. Consequently, the hip projects superiorly on the concave side and is frequently mistaken as a high hip. Scoliosis in the upper part of the spine causes a change in the attitude of the shoulders, causing the shoulder on the convex side of the curvature to be held higher than the one on the concave side.

Rotations:—Most lateral curvatures of the spine are accompanied by a rotation of the bodies of the vertebrae. The vertebra rotates around its sagittal axis so that the side corresponding to the convexity projects backward, for example, in case of a left scoliosis the body of the vertebra is usually rotated to the left, causing the left transverse process to be more prominent than the right. There are exceptions to this rule which depend upon the cause of the scoliosis. Rotation of the

Cut 180

Right Rotatory Kypho-scoliosis in Dorsal Region With Compensatory Curvatures

vertebrae are less noticeable in the small vertebrae, but are prominent in the dorsal region, due to the backward bending of the long ribs on the convex side of the curvature. On the concave side of the curvature the thorax is twisted forward and the ribs slant obliquely downward and approximate each other.

CAUSE OF SCOLIOSIS

Congenital Scoliosis:—These constitute a very small percentage of the scolioses met in general practice, but there is no reason to doubt their existence. They may be produced either by constrained positions during the period of intra-uterine life or caused by symmetrical arrangement of some of the vertebrae. A case of recent data was shown to have a fifth cervical vertebra whose left lamina united with that of the sixth to form a spinous process, the fifth spinous process being formed by the right lamina and a short piece of bone projecting upward from the combined left lamina of the fifth and sixth. In this case the fifth and sixth cervical bodies were fused on the left side, while there was a thin wedge-shaped disc between them on the right. Such a condition is unquestionably the result of a developmental defect and one which would tend to produce a lateral deviation of the spine in the cervical region. Another anomalous case caused by a seventh cervical rib on the left side caused that side of the vertebra to be tilted upward and prevented lateral flexion of the neck to the left, thus giving to the patient a tendency toward carrying the head tilted to the right. This position being constantly assumed during the waking hours of the day, caused the spine to accommodate itself to the condition in such a way that it was productive of a left scoliosis.

During intra-uterine life when the foetus is caused to assume a constrained position and prevented from changing such position because of deficient movement, there would be a natural tendency toward curvature during development, but other things being normal, it is a question as to whether this

tendency would promote a permanent curvature or not because after birth the change of position and the symmetrical development of muscles would tend to rectify and overcome the previous tendency.

Rachitic Scoliosis:—In rachitic children scoliosis is most commonly produced during the first year or two by clumsy carrying and handling or assuming the erect position, or by their being placed in the erect position when the bony structures of the body are soft, due to the lack of calcarious matter. This disease is largely a nutritional disturbance resulting from improper digestion, elimination or both and affects all structures to some extent, although the outstanding feature is lack of calcium salts in the bone. The muscles often present a marked rigidity during the second and third year and unless this muscular rigidity is equal on both sides of the spine, it will tend to produce a lateral curvature of the spine. When such muscular rigidity exists it tends to produce deviations in the shape of the spine regardless of the positions assumed by the child, because the muscular rigidity in itself tends to compress the intervertebral discs and soft centra on the side toward which the upper part of the body leans. In this way the spine grows, increasing the degree of curvature as it becomes longer.

It is claimed by good authority that nearly all advanced cases of scolioses presenting simultaneously a kyphosis, called kypho-scolioses, are caused by rachitic processes. This I believe should be modified to a great extent as it has been conclusively shown that both traumatic and symptomatic curvatures are not uncommonly kypho-scolioses.

Static Scoliosis: — The most common cause of static scoliosis is inequality in the length of the legs. This causes a distortion of the pelvis and spine. In order to hold the trunk vertically above the pelvis the patient must distort the spine into a scoliotic curve. It is not uncommon to find a difference of from one to three centimeters in the length of the legs without any apparent cause. As a rule, this difference gradually

diminishes until the eighteenth or twentieth year and a curvature adaptative to such a difference would diminish in proportion, not uncommonly disappearing. A difference in the length of the legs due to the overlapping of a fracture cannot be changed and the scoliosis adaptative to such cannot be straightened. Congenital dislocation of the hip, diseases of the hip, knee or ankle joint are other common conditions of disease capable of causing a difference in the length of the legs.

Curvatures of this type are usually present before the patient reaches maturity as it is highly improbable that a leg would be materially shortened after maturity except in a case of fracture. However, increase in the length of a leg would be of the same etiological importance in the production of a lumbar scoliosis and this is not uncommon in arthritis of various kinds where bony and calcarious deposits form between the articular surfaces.

Habit Scoliosis:—The habitual assumption of a posture in which the spine takes on a lateral curve for a long period has a great tendency to produce deformity of the intervertebral discs and vertebral bodies conducive to scoliosis. This attitude may be purely passive as seen in a child who regularly sleeps upon one side and uses a large pillow which would cause the spine to always assume the same lateral curve.

An active attitude or posture in which there is muscular action has a much greater effect upon the shape of the spine than a passive attitude. This is shown by the greater frequency of scolioses in individuals taking part in unequal unilateral exercise or following occupations that demand greater exercise upon the part of the muscles on one side of the body. The positions assumed in playing the violin, writing at a high desk, working as a cabinet maker, hod carrier or plasterer and the carrying of loads upon one's shoulder all tend to over develop the muscles on one side and curve the spine toward that side.

Primary Cause:—That, fortunately only a small number of scoliosis develop as a result of faulty attitude or habit, we

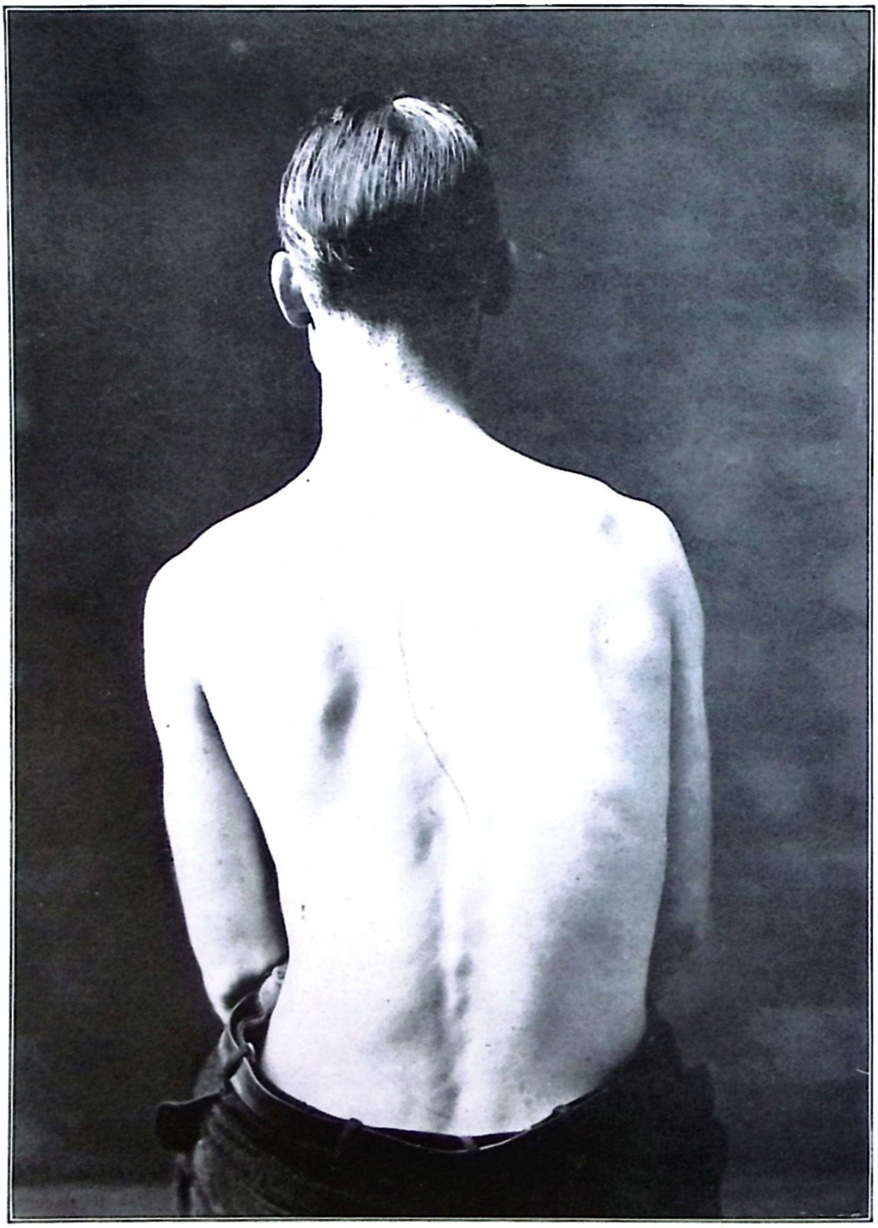
must attribute to a further fact which in itself causes a deformity of the spine. This is unquestionably the vertebral subluxation, which if displaced laterally to the right would cause the left side of the body and the adjacent inervertebral discs to become thin on account of the left side being subjected to the pressure of greater weight in sustaining the upper part of the body. Unless this part of the spine be reinforced and supported by exostotic growths the inclination toward bending will progressively increase, thus a scoliosis grows and is not spontaneously produced.

Other Essentials:—In addition to what has been said relative to the production of habit scoliosis, clinical experience bears out the contention that unusual flexibility of muscles and ligaments and abnormal softness of the bone are more or less essential existing conditions in order to permit an occasionally occurring lateral curvature of the spine to become a true scoliotic deformity. This weakness is also attributed to the existence of a vertebral subluxation which is most commonly found at the apex of the scoliosis. Not only does the subluxation weaken the ligaments of the spine but also by nerve pressure weakens the spinal muscles and affects the metabolic processes occurring in the bony substance itself, for it is a well established fact that all normal function is dependent upon a normal supply of mental impulses. Therefore, if the nerves supplying the muscles supporting the spine become impinged they weaken and are less able to prevent the spine assuming an abnormal shape.

Symptomatic Scoliosis:—The great majority of scoliosis belong to this classification. This being true it is highly important that the practitioner make a searching physical examination for the purpose of determining its organic cause. The superficial mind and superficial examiner are both too apt to find nothing more than the existing scoliosis and not knowing its cause or the condition of which it is symptomatic are incapable of intelligently or otherwise effecting its rectification.

Careful analysis, which can only be attained by careful ex-

Cut 181



Right Rotatory Scoliosis

amination, study and reasoning together with accurate knowledge of the human economy, cannot be too strongly emphasized.

Why Rotatory:—Most symptomatic scolioses are rotatory in character due to the fact that over development of the muscles on one side and a corresponding weakness on the opposite side produce a degree of tortion as well as lateral bending. In this way the transverse processes on the well developed side are drawn posterior while those on the weak side are forced forward thus it will be seen that the bodies of the vertebraë are rotated toward the convexity of the scoliosis.

Scoliosis Due to Sciatica:—In an acute case of sciatica the natural erect position causes great pain at the sciatic notch due to the pressure of the pyriformis muscle upon the sensitive sciatic nerve and in order to relieve this irritation and lessen the muscular tension the pelvis becomes tilted in such a manner that the effected side is elevated. To prevent the trunk from extending outward from the perpendicular at a peculiar angle an adaptative change takes place wherein the spine becomes curved laterally and its vertebrae rotated. This physiological rotatory scoliosis permits the body to be maintained in its erect posture. As soon as the pain is relieved so that the patient can assume a natural erect posture placing equal weight upon both lower extremities, such a curvature will disappear. After many recurrent attacks where the patient has been caused to assume the posture for months or years, the vertebrae will naturally shape themselves in accommodation to the posture so that the lateral bending of the spine which was at one time adaptative now becomes a deformity known as permanent scoliosis. It should be readily seen that inasmuch as this scoliosis is entirely symptomatic of sciatica it can be entirely eradicated by removing its cause—sciatica.

Scoliosis Due to Unilateral Affection of the Lung:—In chronic interstitial pneumonia where one lung has been rendered functionless, the opposite lung must increase its expansion to compensate for the affected lung. In permitting this

increased expansion, the shoulder is raised and the ribs become widely separated and more horizontal while the shoulder on the affected side droops and the ribs slant obliquely downward closely approximating each other. The effect upon the spine is readily seen. The bodies of the vertebrae in the dorsal region become rotated toward the side of the unaffected lung and a rotatory scoliosis results. Other unilateral affections of the lung such as fibroid pithisis, abscess, atelectiasis from any cause and empyema, which causes the affected lung to become contracted are productive of similar scoliotic changes in the spine.

The removal of such curvatures is entirely dependent upon the probability of restoring normal function to the affected viscus and no amount of adjusting upon the curvature will straighten it unless the lung can be made to expand as normal.

Enlargement of the heart in children and young people produce unilateral deviations in the shape of the thorax where the left side bulges laterally and forward with an attending left rotatory scoliosis in the upper dorsal region, which can only be rectified by the heart assuming its normal size.

Scoliosis Due to Adhesions:—Following an appendectomy it is not uncommon for intra-abdominal adhesions to form in the right side and attach the abdominal wall in such a way that it is drawn backward by them. When the patient assumes the erect position the tension produced upon these adhesions causes pain, and to minimize the pain the patient involuntarily leans the trunk forward to the right so that a dorso-lumbar kypho-scoliosis is produced. This attitude assumed for any great length of time will ultimately lead to permanent curvature which would be amenable only to the removal of the adhesions and in such cases the practitioner should avoid attempting rectification of the curvature without first giving adjustments for the removal of the adhesion.

Scoliosis Due to Hemiplegia:—In elderly people, apoplectic hemiplegia is a common organic cause of rotatory scoliosis which is produced by the inability to use the arm and leg on

the affected side equal with those on the unaffected side. Over-exercise of the muscles on the unaffected side resulting in their hypertrophy and favoring the paralyzed side is largely responsible for curvatures in these cases.

Scoliosis Due to Monoplegia:—Paralysis of one leg or one erector spinae muscle always results in spinal scoliosis. The convexity in such paralytic scoliosis is not directed toward the diseased side as may be presumed, but turns toward the sound side. To overcome the deficient action of the paralyzed erector spinae muscle, the patient bends the upper part of the trunk toward that side so that the force of gravity antagonizing the support of the other sound erector spinae muscle holds it in balanced suspension over the pelvis.

Traumatic Scoliosis:—Injuries during infancy and childhood incurred often by a slight fall in play, are undoubtedly responsible for a very large percentage of primary scoliosis. The beginning of such a scoliosis is a prominent lateral displacement of a vertebra which causes the adjacent intervertebral cartilages to become wedge-shaped and the spinal muscles on one side to become weakened. The deformity of the intervertebral discs, creates the tendency for leaning toward one side and the weakness of the muscles, normally supporting the spine, being unable to resist or overcome this tendency, the lateral bending occurs and progressively increases in degree. The primary causative subluxation will be found at the apex or angle of the scoliosis.

The scoliosis may not be detected for months or years after the primary injury due to the fact that its development is gradual and that it may exist and be observable but is not recognized by the unskilled layman. Inasmuch as pain is not an attending symptom of scoliosis, parents of scoliotic children remain ignorant of the deformity until they observe the child constantly assuming an unnatural attitude or posture or until the curvature is readily visible. Therefore, when no condition exists to which the curvature may be attributed, it is important that the practitioner carefully examine the early history of

the case as it will undoubtedly show one or many minor injuries early in life capable of producing the causative primary subluxations.

FREQUENCY OF SCOLIOSIS

Scoliosis is the most frequent deformity of the spine and it is claimed by good authority that from twenty-five to thirty percent of all school children are scoliotic. In schools for boys the percentage is not quite so high, yet most of the marked cases are found among boys. The reason for this is, in all probability, that boys engage in more rough play and games and attempt many antics which result in injury and that little attention is paid to an erect posture in boys so that the resulting scoliosis often remains neglected until it has become advanced.

Inasmuch as the percentage of adults having scoliosis is less than the above stated, it must be presumed that a large number of those found in children are of the type known as habit scoliosis or unilateral bending due to uncertainty of attitude. The change of habitual attitudes with age would then be responsible for their disappearance because they are purely adaptative to the posture assumed.

STRUCTURAL CHANGES

Scolioses of short duration produce but trifling deviations from the normal anatomy of the spine, while marked scolioses of long duration produce pronounced changes in the form and function of the spine. In general, the following rule may be applied to soft tissues and the osseous vertebrae; every part located on the concave side is shortened and every part located on the convex side is lengthened. The vertebrae and ribs are pressed together on the concave side whereas on the convex side the ribs spread apart, thus enlarging the intervertebral spaces. At the same time the curvature of the ribs undergoes a change. On the convex side the ribs are deflected toward the front in the region of the posterior angle unless their anterior

extremity is raised. This pronounced deflection forward at the posterior costal angle causes them to become more straight anteriorly.

The opposite condition prevails on the concave side of the trunk. Here the ribs are exceptionally straight posteriorly and display a somewhat deflection near the sternum at the articulation of bone, forming the so-called anterior costal hump.

Visceral Tendencies:—Therefore, in marked scoliosis the principal work in breathing is performed by one lung. The inactivity of the opposite lung favors apical tuberculosis, which exists or develops in a surprisingly large percentage of children having dorsal scoliosis. The heart often becomes hypertrophied due to the strain and crowding and is not infrequently displaced to the right or left by the change in the bony thorax. In most all cases the aorta follows the scoliotic curvature but it is not infrequent to find the esophagus displaced or kinked, but only in the most pronounced curvatures. Atrophy of the intercostal muscles from non-use and intercostal neuralgia due to nerve pressure are very common on the concave of the scoliosis.

DETECTION OF SCOLIOSIS

The careful practitioner makes a careful visual examination of the spine and back before making the more detailed examination by palpation. This visual examination should reveal the more prominent curvatures, their nature in general, and location. In order to secure a natural attitude uninfluenced by a sense of modesty, the clothing should be arranged so that the back alone is exposed and it is highly essential that the entire spine be exposed to view including the sacrum. The patient should be seated upon a level bottomed chair or stool of the proper height (about fourteen inches) not having a back. The patient should sit in a natural, erect posture with both feet placed squarely on the floor.

Visual Examination:—Comparison with a vertical line is essential to determine the presence of a scoliosis. This vertical

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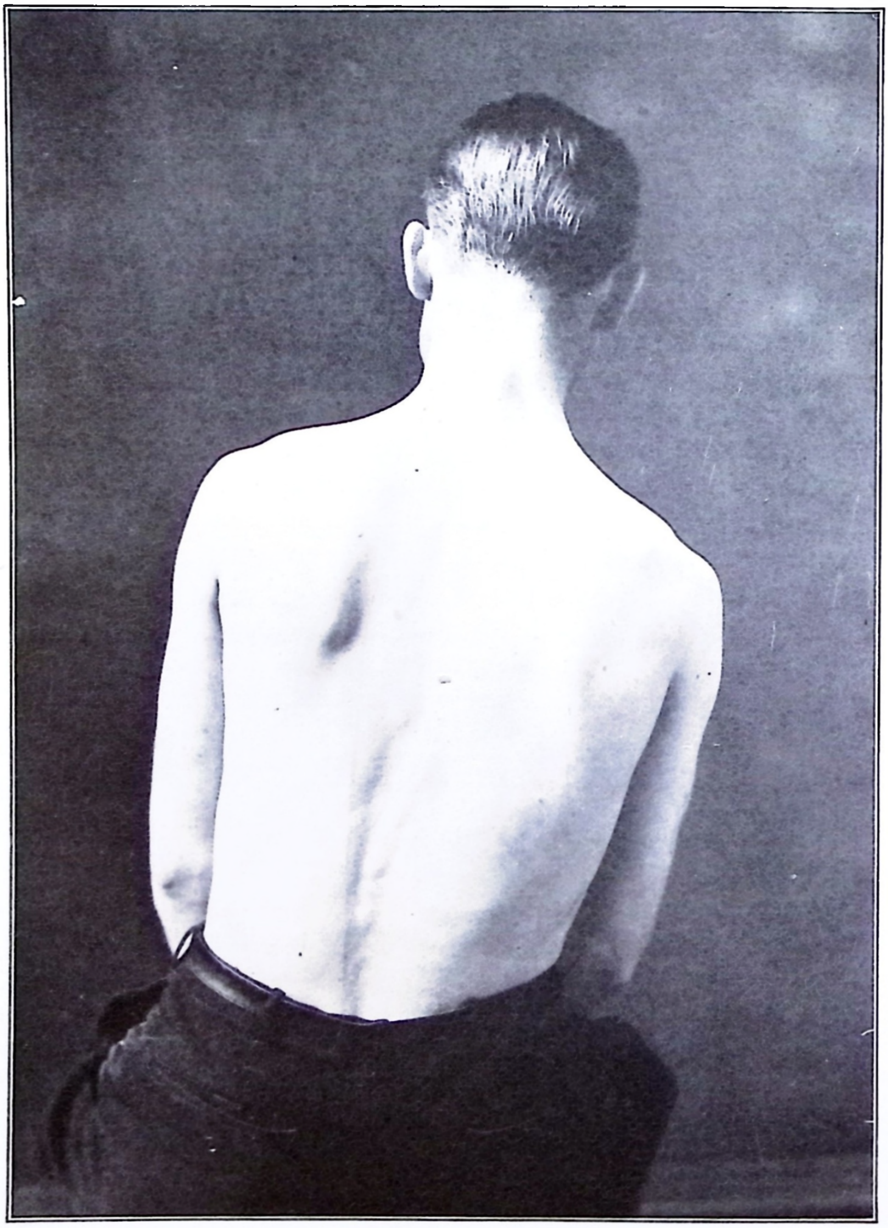

Determining Flexibility of the Spine to Right by Lateral Flexion

line may be imaginary or a weighted string may be suspended from the ceiling and brought to bear upon the line of the spine. Visual comparison between this vertical line and the line of the spine should then be made. The lateral contours and the symmetry of the waist triangle should be carefully noted as an irregularity of the waist triangle always indicates rotatory scoliosis in the lumbar region even though the spinous processes present but very little deviation. Examination at the scapulae reveals whether the spines of both scapulae are located in the same horizontal plane and whether the inner scapular borders are held at equal distances from the line connecting the spinous processes of the vertebrae. A difference in the position of the scapulae is very frequently noted especially in patients who in their occupation make more use of one side of their body. The excessive muscular development upon the enlarged side tends to draw the spine in that direction.

Upon having the patient lean laterally from side to side without raising either side of the pelvis from the chair it will be seen, by inspecting the line of the spinous processes, whether or not there is a greater flexibility toward one side than toward the other. If the patient can lean farther to the right it would indicate left scoliosis while if the patient could lean farther to the left it would indicate right scoliosis.

Palpation:—After having made such visual examination a careful searching palpation should be made, exploring carefully both the spinous and transverse processes. A long gliding movement over the tips and sides of the spinous processes is ordinarily sufficient to detect the slightest lateral deviation of the spinous line. This gliding movement should be first made with one hand and then with the other and if the finding resulting from the examination of both hands coincide, there is little chance of error. However, the practitioner should avoid placing weight upon either shoulder, as the lowering of a shoulder will cause the spine to bend laterally.

Transverse palpation:—Transverse palpation is not only valuable in the listing of any subluxation but is particularly

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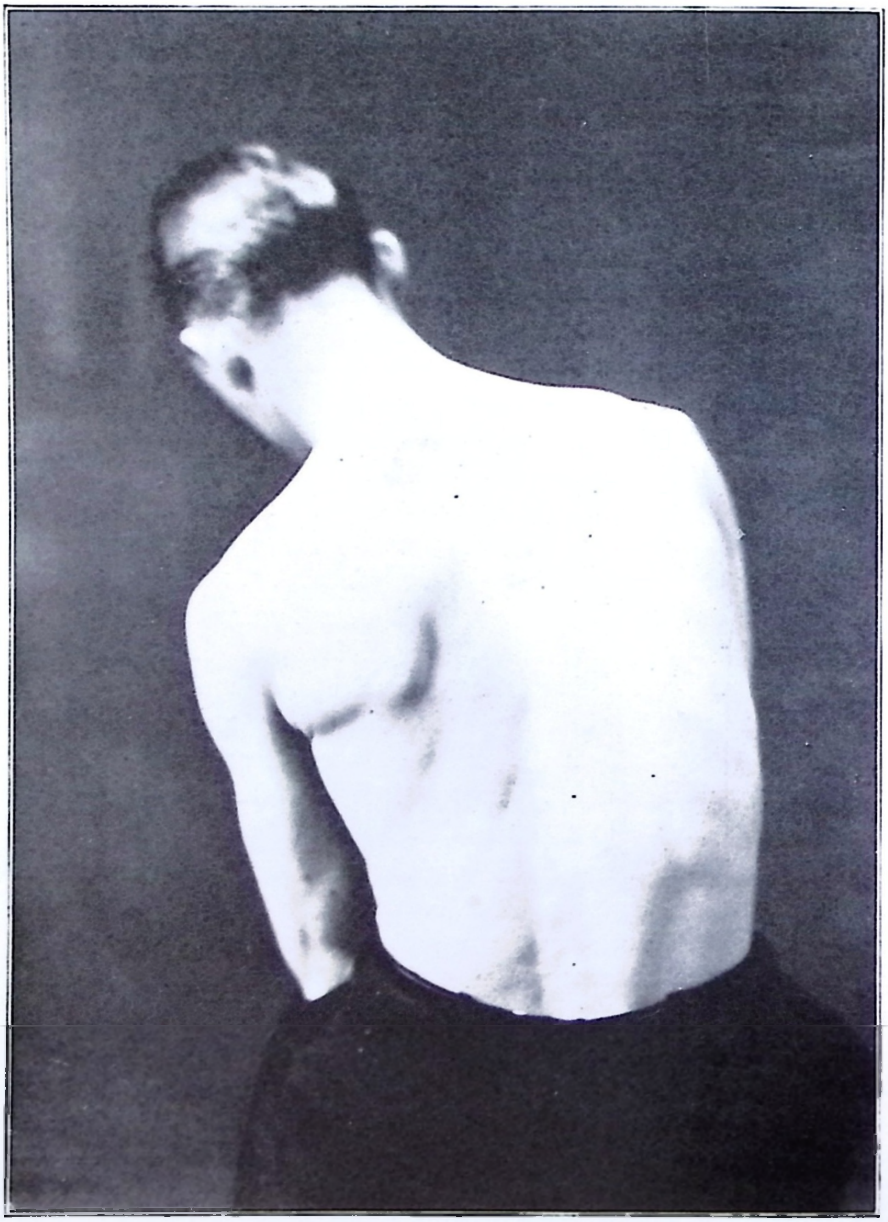


Determining Flexibility of the Spine to Left by Lateral Flexion

valuable in detecting the existence of rotatory scolioses. It will be found that the transverse process on the side which the body of the vertebra is rotated is more posterior than its opposite. When several adjacent vertebrae are found to have posterior transverse processes on one side it is a positive indication that a rotation exists. It should be remembered that transverse palpation is indispensable in determining the existence of and exactly locating rotations.

LISTING OF SCOLIOSIS

The analysis record should not only show the vertebrae to be adjusted and their direction of subluxation but should also contain the name of the curvature together with its extent. In case of right scoliosis this may be done by writing right scoliosis from fourth dorsal to second lumbar, or right rotatory scoliosis from eighth dorsal to first lumbar inclusive.

Listing Primary Scoliosis:—If the object of the adjustment be to straighten the scoliosis and that alone, as it may be in cases of habit and traumatic scoliosis the vertebra at the apex of the scoliosis should be selected for listing: It may be listed right or left as the case may be, which will indicate the direction of subluxation and its opposite the direction of adjustment. However, should a rotatory scolisosis exist, in addition to listing the apical vertebra, it should be stated that a rotation exists as the rule for adjusting a rotatory scoliosis differs widely from that used in adjusting a scoliosis without rotation. It may sometimes be found adventageous to list two or even three non-adjacent vertebrae which are most pronouncedly subluxated in the direction of the scoliosis. They should be adjusted until they cease to be the most pronounced vertebra in the curvature after which a re-analysis should be made and other vertebrae selected for adjustment.

When apex of curvature is not listed:—If the patient is suffering from a disease which is of more importance in the preservation of life than the curvature, the vertebra causing that disease should be selected for adjustment and listed re-

gardless of its position in the curvature. It is better to relieve a disease in a short space of time by adjusting a vertebra toward the convexity of the scoliosis, if necessary than to spend much time in attempting to bring the rest of that curvature in line with the causative subluxation during which time the disease might be gaining momentum that could never be checked or that would be more injurious to the health of the patient than the curvature. In many instances, better results will be obtained by making a curvature more regular than by attempting to straighten the curvature itself.

When curvature is not considered in listing:—When a scoliosis is symptomatic or the result of a diseased condition existing within the body the object of the adjustment is two fold—that of restoring health to the diseased part and straightening the spine. Inasmuch as symptomatic scolioses are adaptative to disease they are but symptoms and should be entirely ignored in selecting the vertebra for adjustment. After determining the seat of the disease its cause may be established by referring to the Meric System. Examination by vertebral palpation and nerve tracing should then be made in that region of the spine and the causative subluxation listed.

ADJUSTMENT OF SCOLIOSES

Position of patient:—The patient should be placed face downward upon a bifed or two-piece bench with the face turned toward the side of the curvature. This is particularly important when the scoliosis is in the cervical or dorsal region, as it tends to curve the spine toward the medial line and separates the bodies of the vertebrae on the concave side of the scoliosis, thus permitting movement with a minimum amount of force. By turning the face toward the side of the scoliosis the spinous processes are rotated in the opposite direction and the transverse processes on that side are rotated posteriorly thus making contact and direction of adjustment relatively easy.

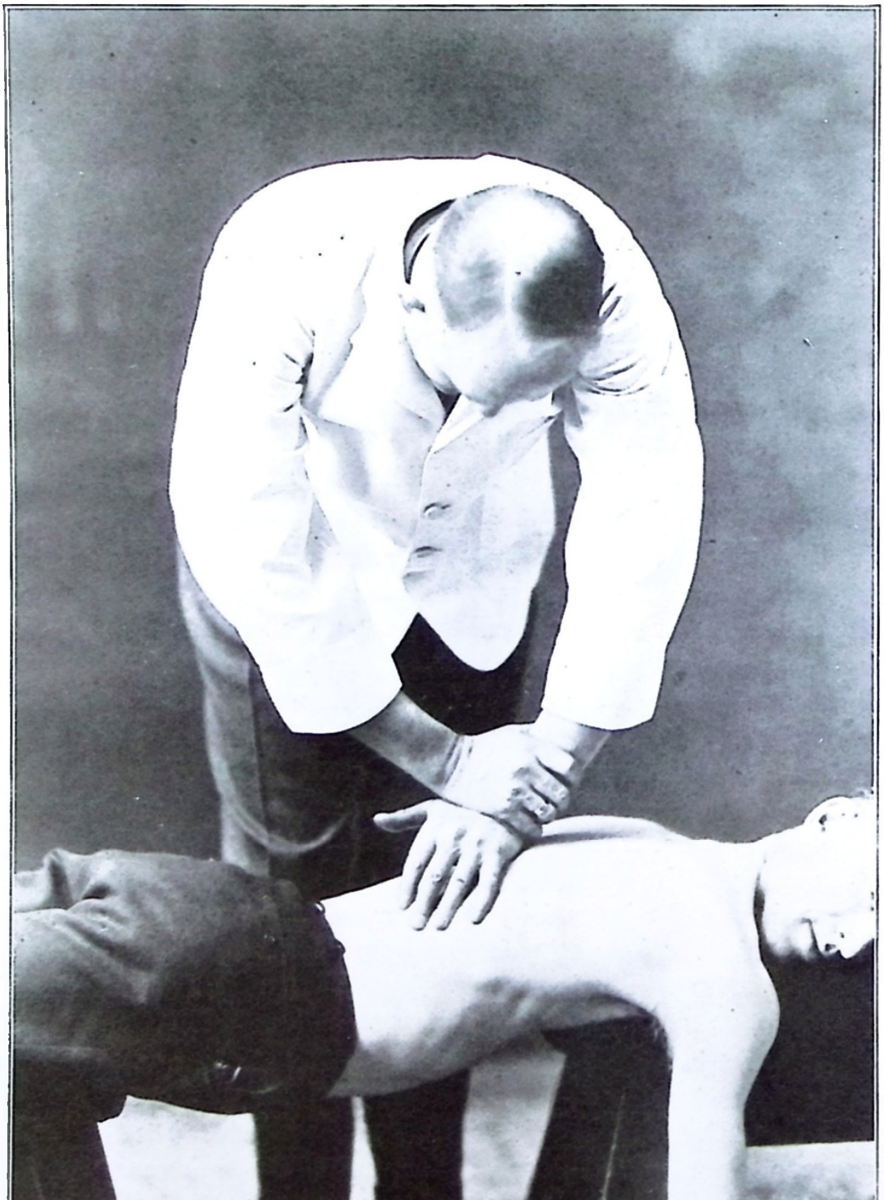
Placing of Patient:—The patient should be placed on the forward section of the bench so that its rear edge rests just below the axilla. The thigh should rest on the rear section so that the symphysis pubes is free from the bench. This position permits free relaxation and eliminates all possible chances of injury.

Position of adjuster:—The adjuster may stand on either side although in pronounced lateral curvatures it may be found much more convenient to stand upon the concave side of the curvature. The exact detail in standing position, palpation, placing of hand in contact and adjustic movement is the same as heretofore described under adjusting. The point of contact and the direction of drive however, may deviate from that heretofore described and will be considered presently.

Contact in Scoliosis:—If the vertebrae in the scoliosis are not rotated or if the spinous processes are rotated toward that side of the scoliosis the contact for adjustment should be made on the spinous processes, in the manner heretofore described. When the vertebra selected for adjustment has superiority or inferiority as well as laterality due consideration should be given all directions of subluxation in making the adjustment, but inasmuch as the aim of the adjustment is to straighten the lateral deviation, laterality should be emphasized. The amount of laterality to be used will vary in different degrees of curvature and must be judged by the practitioner. However, at no time should the laterality be exaggerated to such an extent that it will be conducive to slipping or changing of the point of contact in making the adjustment.

Contact in Rotatory Scoliosis:—When the curvature is a rotatory scoliosis in which the spinous processes are rotated away from the side of the curvature, that is when the spinous processes are rotated toward the concave side of the curvature, it can be readily seen that a spinous process contact would either increase the degree of rotation or increase the laterality of the scoliosis. This is because the spinous processes form a linear ridge which points toward the concave side of the sco-

Cut 184



Contact and Showing Position for Adjusting Right Rotatory Scoliosis

liosis and the line of drive which would be necessary to rotate them back would have been directed from the horizontal plane or below it.

A careful study of the curvature of the spine from a mechanical standpoint will readily show that a rotatory scoliosis can be more readily corrected by adjustment on the transverse processes, that is when the curvature is primary and not the result of any organic change occurring outside of the spine itself. When the bodies of the vertebrae are rotated to the right, the right transverse processes will be more prominent The vertebra at the apex of the scoliosis should be selected for adjustment.

The relation of the transverse process to the spinous process is as follows:—In the dorsal region from the third to the tenth inclusive, the transverse process of the vertebra is opposite the second interspinous space superior to its spinous process; the transverse processes of the upper and two lower dorsal vertebrae are about at a point opposite the spinous process superior to the vertebra in question; in the lumbar region the contact is made on the mammillary process, because of its greater accessibility, it being situated posterior and inferior to the superior articulating process or at a point opposite the superior border of the spinous process of the vertebra in question.

The pisiform contact should always be used in adjusting on the transverse and mammillary processes. When standing on the left side the left hand is used as nail hand and when standing on the right, the right hand is used as nail hand as previously described. In making contact on the mammillary process it is important that the contact be made as close to the spinous processes as possible. This is important to prevent part of the force used in the adjustic move being applied to the transverse process, which in the lumbar region is very slender, and not able to sustain much force. It is also important to avoid taking a position that will permit any force being delivered on the spinous process as that would tend to increase the degree of rotation regardless of the direction of the drive.

Cut 185

Showing Direction of Drive in Adjusting Right Rotatory Scoliosis

Direction of the Drive:—The direction of the drive varies in every degree of rotation. In general it may be said that when no lateral deviation exists the force should be applied in a line perpendicular to the plane of the transverse processes. However, it is not common that rotations without lateral deviations are encountered so that in the majority of cases the direction of the drive must be modified according to the laterality of the curvature as well as to the degree of rotation.

If the sixth dorsal vertebra is the apex of a right rotatory scoliosis, the contact is made on its right transverse process. If the force is applied in a line perpendicular to its transverse processes it would tend to rectify the rotation of that vertebra, but would also tend to increase the degree of the scoliosis, so in order to overcome this latter tendency the force is applied perpendicular to the floor, or nearly so. This latter direction of drive would not only rotate the vertebra in the desired direction but would also move it laterally toward the median line of the body. Due variation in the direction of drive must be made in the various degrees of rotation and can be best determined by that practitioner who is adaptable and can visualize the spine in its present condition. If he has the proper mental picture, but very little knowledge of mechanics would be necessary to tell him the proper angle at which his force must be applied to accomplish the desired end.

In adjusting upon the mammillary processes in the lumbar region, the line of drive is the same as described above with the exception that there is less variation in this region, due to the fact that the most pronounced rotatory scolioses are found in the dorsal region.

Speed is fully as important in adjusting upon the transverse and mammillary processes as in adjusting upon the spinous processes. With speed ordinary muscular strength will accomplish much in the moving of a vertebra, and in curvatures where the vertebrae are wedged and hard to move, its employment is an outstanding essential.

EFFECT OF ADJUSTMENT

The adjustment not only moves the vertebra in the prejudged direction, which tends to straighten the spine, but it also releases pressure upon the spinal nerves which supply various organs including the spinal muscles. By restoring the uninterrupted flow of mental impulses to the spinal muscles they are strengthened and increased in their tone, better enabling them to give the spine the support they normally should. When the muscular tonicity in the spinal muscles is equal on each side of the spine the tendency is to keep the spine erect, thus, after the muscles are made stronger the adjustments become more effective in that the tendency of the vertebra in returning to its old position is greatly decreased.

Value of Repeated Adjusting:—Repeated adjusting of the vertebrae also causes the condition of the spinal ligaments to change and by such change their tendency is to hold the vertebra where placed. This too adds to the effectiveness of future adjustments.

Every time the vertebra is moved a certain amount of friction is produced upon the moveable surface. This friction induces a physiological thickening of the cartilages which tends to make the vertebra approach its former normal shape. When it has attained that normal shape the tendency to remain in the normal position is greater than the tendency to become subluxated. Therefore force, awkwardly applied, is necessary to displace the vertebra.

PROGNOSIS

The prognosis of all conditions is more or less dependent upon the age of the patient, amount of vitality, nature of the disease, probability of restoring or rebuilding alterations in structure and the ability of the Chiropractor in selecting the vertebra to be adjusted and moving it. All these must be taken into consideration in prognosticating the outcome of curvature under adjustment as well as other diseased conditions.

In **rachitic scolioses** in which the bodies of the vertebrae have become softened and wedge-shaped, there is but little opportunity of straightening the spine, yet adjustments are beneficial in checking the progress of the disease and restoring function in organs having incoördination.

In **congenital scoliosis** many disappear without adjustments as the child is permitted to assume normal positions conducive to a straight spine. Many such congenital curvatures which would not entirely straighten by this change in attitude can be entirely changed by adjustments, the probability for affecting a perfectly straight spine being greater if the case is adjusted before reaching maturity. Those cases of congenital scolioses due to malformation of the vertebra or trunk are not readily rectified.

Static scolioses may be straightened under adjustments unless it is adaptative to a malformation that cannot be rectified, such as congenital dislocation of the hip where the acetabulum has become filled with bony deposits preventing any possibility of its replacement.

Habit scolioses, as a rule, can always be entirely eliminated by adjustments unless of long standing or late in life, where the vertebrae themselves have become mishapen and ankylosed.

Symptomatic scolioses being more frequent and adaptative to a great variety of conditions make its prognosis more complex. Its rectification depends entirely upon the possibility of removing the condition of which it is symptomatic. Organic changes can occur in an organ that will permanently render it functionless and in such a case there would be little possibility of straightening the curvature resulting from such a change. For example, in fibroid phthisis where a large part of one lung is destroyed and incapsulated within a dense growth of fibroid connective tissues there is but little chance of making that lung again function, hence the rotatory scoliosis in the dorsal region which is produced would be a permanent fixture. There are numerous cases of symptomatic sco-

liosis that are readily amenable to adjustments, as that occuring in sciatica, acute pleurisy, etc. It may be said that the prognosis of symptomatic scoliosis differs in each individual case and should be readily determined by the practitioner from his knowledge of the existing organic causes.

Traumatic scolioses, as a rule, respond readily to the adjustments unless the vertebrae have been fractured and become ankylosed by exostotic growths and there are even some of these that respond to repeated adjustments.

QUESTIONS FOR STUDY

1. Define Scoliosis.
2. What condition is commonly mistaken for scoliosis?
3. How can they be differentiated?
4. What is a total scoliosis?
5. How are scolioses named?
6. What is a compensatory scolioses?
7. Where are compensatory scolioses located?
8. In what direction do they deviate?
9. What change takes place in the lateral outline of the trunk when scolioses is present?
10. In what respects may the shoulders and hips be assymmetrical?
11. What is a rotation?
12. Upon what are the vertebra rotated?
13. In a right scoliosis how are the bodies of the vertebrae rotated?
14. In what direction do the transverse processes move in a right rotation?
15. Where are rotations most noticeable?
16. In what two parts of the spine are they more common?
17. What thoracic changes are encountered in dorsal rotations?
18. What is a congenital scoliosis?

19. To what are they due?

20. What malformations are conducive to their development?

21. Discuss the cause of rachitic scoliosis?

22. Explain their mode of movement.

23. To what extent is muscular rigidity responsible for their development?

24. What is a kypho scoliosis?

25. What is meant by static scolioses?

26. Explain their production.

27. What is the posture of the pelvis in a static scoliosis?

28. At what age do they develop?

29. What traumatic conditions favor their production?

30. Name two diseases favoring their production.

31. What is a habit scoliosis?

32. How can it be explained Chiropractically?

33. Explain the relation of occupation to habit scoliosis.

34. What is the primary cause of habit scoliosis?

35. In what part of the spine would it most likely occur?

36. What organic weakness may this primary subluxation produce that would favor scoliosis developing?

37. What is symptomatic scoliosis?

38. What is its relative frequency?

39. How are symptomatic scolioses differentiated from other forms?

40. Why is it important to make examination for disease of an organic character in patients having scoliosis?

41. Why are most symptomatic scolioses rotatory?

42. Explain how sciatica can produce a lumbar scoliosis?

43. How can it be removed?

44. Explain the production of dorsal scoliosis in unilateral affections of the lung.

45. Name five such diseases.

46. Upon what does the correction of these scolioses depend?

47. What is the effect of an enlarged heart upon the shape of the spine and thorax?

48. In what way can abdominal adhesions produce spinal curvatures?

49. Explain the changes following apoplexy that lead to spinal curvatures.

50. Discuss the effect of muscular tonicity upon the shape of the spine.

51. How are traumatic scolioses produced?

52. Explain in detail the process.

53. How are they detected?

54. In what two respects is the history of the case valuable to the practitioner in handling these cases?

55. In what class of individuals are scolioses more common?

56. To what may this be due?

57. Describe the structural changes that take place in the spine in scoliosis.

58. Describe the structural changes occurring in the thorax.

59. What organic disease is favored by upper dorsal scolioses?

60. What visceral changes may result from scolioses?

61. What two methods of examination should be employed in ascertaining the existence of a scoliosis?

62. State four symptoms that can be detected by inspection.

63. Describe the technic of digital examination of scolioses.

64. State one important thing to avoid in examining the spine for scoliosis or suspected scoliosis.

65. Explain the value of transverse palpation in determining the existence of scoliosis.

66. Give an example to illustrate above answer.

67. How should a scoliosis be indicated on the listing record?

68. What vertebra should be selected for adjustment in a primary scoliosis?

69. How should the vertebra be listed if the scoliosis is rotatory?

70. Why is it unwise to alternate upon adjacent vertebrae in a lateral curvature?

71. Under what circumstances would you adjust vertebrae in a scoliosis other than those causing it?

72. What is the major consideration in adjusting for a symptomatic scoliosis?

73. How is the vertebra for adjustment ascertained?

74. What organic change must take place before these curvatures disappear?

75. What is the position of the patient upon the adjusting table?

76. Toward which side should the face be turned in adjusting a scoliosis. Explain.

77. State an exception to this rule.

78. Locate the exact point of contact in adjusting a scoliosis.

79. What is the advantage of the spinous process contact?

80. State the point of contact in adjusting a rotatory scoliosis.

81. What is the advantage of this contact?

82. Describe the direction of drive in adjusting a rotation and explain its advantage.

83. When is the contact made upon the mammillary processes?

84. What is the direction of the drive in this contact?

85. What is the relation of the spinous to the transverse processes topographically?

86. What is the relation of the spinous to the mammillary processes topographically?

87. What nail point is used when adjusting upon the mammillary processes?

88. Why is it important to avoid applying force upon the spinous process in giving a mammillary process adjustment?

89. Explain the three effects that result in the spine from the adjustment for scoliosis.

90. Upon what factors is the prognosis of curvature dependent?

91. State the prognosis of rachitic scoliosis.

92. State the prognosis of congenital scoliosis and give reasons for same.

93. Give an example of static scoliosis not amenable to adjustment.

94. What is the usual outcome in adjusting habit scoliosis?

95. Upon what does the correction of symptomatic scoliosis depend?

96. How can the outcome be judged?

97. Explain the value of a knowledge of pathology in prognosticating symptomatic curvatures.

98. What symptomatic scolioses are most readily corrected?

99. In what way does ankylosis and exostosis interfere with results in scoliosis?

100. What is the usual outcome of traumatic scolioses under adjustment?

LORDOSIS

Lordosis is an anterior curvature of the spine with the convexity directed forward. Lordoses are always symptomatic or the result of other organic defects occurring either in the spine or elsewhere in the body. When found it is usually in the lumbar region and is an exaggeration of the normal curve in this locality. The conditions to which it is adaptative may be grouped in four classes, viz., hip joint disease, enlargement of the abdomen, paralysis of the spinal muscles and kyphosis occurring elsewhere in the spine.

LORDOSIS DUE TO HIP JOINT DISEASE

In marked flexor contraction in one hip joint occurring after coxitis the patient in placing the diseased leg parallel to the sound one, is forced to rotate the pelvis in such a manner as to considerably tilt the base end anteriorly. The sacrum then assumes a more or less horizontal position and the lumbar portion of the spine follows an anterior curve in order to permit articulation of the fifth lumbar with the sacral base. To prevent the trunk from falling forward the upper half of the spine is bent backward while the lumbar portion assumes a marked lordotic form.

In bi-lateral dislocation of the hip joints, the lordosis results from the displacement of the heads of the femurs behind the sockets. The front part of the pelvis then becomes too heavy, sinks downward and forces the patient, for the sake of keeping the balance, to compensate with an extreme lordosis of the spine in the lumbar region. Among the causes of lordosis due to hip joint disease may be included, fractures of the surgical neck of the femur which have never been properly set, and if overlapping of the fractured surfaces occur causing one leg to be shorter than the other, the lordosis will be complicated with rotatory scoliosis. It is surprising to know that a large percentage of lordosis results from congenital and traumatic dislocations, fractures and tubercular coxitis.

LORDOSIS DUE TO AN ENLARGED ABDOMEN

The majority of lordoses due to this cause are not only symptomatic but most commonly are of temporary existence. It can readily be seen that when the abdomen is distended by pregnancy, ascites and large abdominal tumors that the bulk of the weight is sustained by the abdominal muscles which are pulling the lumbar region of the spine forward and in order to properly balance the weight of the anterior and posterior of the center of equilibrium it is necessary to throw the shoulders backward. This comparatively exaggerates the degree of the

lordosis. As soon as the abdomen decreases in size the lordosis will disappear of its own accord.

LORDOSIS DUE TO SPINAL PARALYSIS

Lordosis of this type is most commonly seen in progressive muscular atrophy, pseudo hypertrophic muscular paralysis and the other forms of muscular dystrophy. The weakening of the spinal muscles, which is due to atrophy, necessitates throwing the head and shoulders backward in order to retain proper balance. The lumbar region then becomes curved forward because of the loss of its muscular support. Lordoses of this type may be made to disappear upon assuming a sitting posture, providing the patient is resting his back or arms upon a support.

LORDOSIS DUE TO KYPHOSIS

Lordoses that result from kyphosis may occur either in the cervical or lumbar region and when the kyphosis involves a large part of the dorsal spine it is not uncommon to find two lordoses, one in the cervical region and one in the lumbar region. The lordoses in this case are physiological curvatures because they form in adaptation to the kyphosis in order to compensate the changes occurring in equilibrium due to it.

There are practically no structural changes that take place in the spine as the direct result of lordosis. The bulk of the weight is sustained by the articular processes which are composed of dense bone. The intervertebral cartilage becomes somewhat thickened at its anterior extremity but, owing to the fact that this cartilage is readily compressible, its thickening does not interfere with straightening of the lordosis.

ADJUSTMENT OF LORDOSIS

Since it has been shown that lordoses are entirely adaptative or the direct result of some other disease, it can readily be seen that their removal depends entirely upon rectifying the condition to which they are adaptative.

It is very common to find an occasional posterior subluxation in a lordosis. Such subluxation may cause incoördination in some other part of the body and should such an ailment be the major trouble or impede the securing of results in straightening the spine, it should be adjusted. As an example, it is not uncommon for a patient with a lumbar lordosis to have ovarian trouble due to a third lumbar subluxation. The only way in which to restore normal function to this diseased organ is to adjust the third subluxated lumbar and it may be adjusted without any fear of increasing the degree of lordosis. In fact, a lordosis cannot be produced by adjusting vertebrae toward the anterior, yet amateurs often avoid adjusting vertebrae in a lordosis, which not infrequently accounts for their failure to get results.

Lordoses due to dislocation of the hip joints will disappear upon reduction of the dislocation, but cannot be removed by any other method or process. When resulting from stiffness of the hip joint due to inflammatory processes its removal is dependent upon the possibility of restoring free movement to the affected joint and, if possible, it should be accomplished by adjusting K. P. and lower lumbar.

When the lordosis results from a fracture which has been improperly set, there is no possibility of removing it, as the posture of the spine is adaptative to the deformity. Ankylosis of the hip joint, in which the cartilage has become ossified, is a common organic cause of lumbar lordosis that cannot be rectified by adjustments.

The removal of a lordosis due to an enlarged abdomen can be accomplished by adjustments in various portions of the dorsal and lumbar regions. If due to ascites in atrophic cirrhosis of the liver, the adjustment would be liver place and K. P. If due to an ovarian cyst the adjustment would be K. P. and middle lumbar. If due to an abdominal tumor the adjustment would be given in the zone of the growth. Thus it will be seen that it is first necessary to determine the nature and

location of the condition producing the enlarged abdomen and make the adjustment accordingly.

Adjustment for lordosis due to progressive muscular atrophy and other forms of spinal cord disease is upper cervical and K. P., because the pathology is situated in the cervical enlargement of the spinal cord.

When the lordosis is adaptative to kyphosis its removal is dependent upon the removal of the kyphosis. See section on kyphosis. When the kyphosis is removed there will be no further necessity for the compensating lordosis and it will disappear of its own accord according to the law governing its production.

PROGNOSIS

Congenital dislocation of the hip joint in which the acetabulum has become obliterated by bony deposits there is but little opportunity of the articulation ever becoming normal, hence but little opportunity of ever rectifying the symptomatic lordosis. Lordoses due to ankylosis and fractures are, as a rule, permanent fixtures and little hope should be entertained for their removal.

Lordoses due to enlargement of the abdomen are readily rectified by proper adjustments which will effect the removal of the abdominal enlargement. Unless the condition is far advanced, as a long-standing case of ascites due to gin liver, the prognosis may be considered favorable.

Progressive muscular atrophy and the various forms of muscular dystrophy are very stubborn affections and unless secured for adjustment early in the disease, there is but little probability of restoring the condition to normal or removing its symptomatic lordosis.

Lordosis adaptative to kyphosis can be removed providing the kyphosis does not have structural changes that would prevent its removal. Most kyphoses due to rickets, habit and injury are readily removed by the proper adjustment and naturally the adaptative lordosis would disappear with it.

QUESTIONS FOR STUDY

1. What is a lordosis?
2. How are they classified with regard to cause?
3. In what part of the spine are they most common? Why?
4. May more than one lordosis exist in the spine?
5. If so, where are they located?
6. Explain how flexor contraction of one hip joint produces lordosis.
7. Is this lordosis a simple or compound curvature?
8. Explain the effect of bilateral dislocation of the hip upon the spine.
9. Why do some fractures of the femur produce spine curvatures and others not?
10. How does enlargement of the spine produce lordosis?
11. In what part of the spine is such a lordosis found?
12. State five causes of enlarged abdomen.
13. What is the effect of spinal paralysis upon the spine?
14. Name two such diseases producing lordoses.
15. State the cause of these diseases.
16. What would be the proper method to employ in the removal of such lordosis?
17. Explain how a kyphosis in one part of the spine will produce a lordosis in another part.
18. What structural changes result from lordoses? Why?
19. Should vertebra in a lordosis ever be adjusted? Explain.
20. Is there any danger in increasing a lordosis by adjustment of vertebrae in it?
21. In what part of the spine should the adjustment be given when the lordosis is due to hip joint disease?
22. What are the prospects of eliminating such a lordosis?
23. Discuss the adjustment for lordoses due to enlargement of the abdomen.
24. State the prognosis.
25. Discuss the adjustment for lordoses due to kyphoses.
26. To what extent can they be removed?
27. What is the position of the sacrum in lumbar lordosis?

28. Is it essential that the apex of the sacrum be posterior in lumbar lordosis?
29. What is the attitude of the head in cervical lordosis?
30. State two ways in which lordoses can be detected.

SPINA BIFIDA

Spina Bifida is commonly known as cleft spine. It is due to failure of the posterior neural arch to form. The lamina, as a rule, form and under palpation appear like a double spinous process between which is a tender area covered only by the superficial integument.

This is a developmental defect which may be caused either by a subluxation in the mother during development of the foetus, or by the early production of a subluxation in the spine of the child before the process of ossification has been completed. If the latter this subluxation would exist at some point superior to the cleft of the spine.

Cleft vertebrae are most common in the lumbar and sacral regions but may occur in the cervical region and are very infrequent in the dorsal region.

A number of adjacent vertebrae may be cleft without any protrusion of the meninges of the cord, but a majority of the cases develop one of three pathological conditions, viz.: meningocele, meningomyelocele, and syringomyelocele.

In meningocele the spinal membranes alone protrude, forming a sac which contains cerebro-spinal fluid. This may vary in size from that of a pigeon egg to a large pendulous mass six or seven inches in diameter.

Meningomyelocele is a protrusion of the meninges and the spinal cord through the aperture between the lamina. This is usually of small size and is nearly always accompanied by bilateral paralysis. It is much less common than the preceding condition.

In syringomyelocele the posterior half of the spinal cord, together with the overlying meninges, protrude through the

uncompleted posterior neural arch. In this the central canal of the spinal cord is dilated and contains a considerable quantity of cerebro-spinal fluid. This form is also small in size and nearly always attended by paralysis or deformities in the lower extremities.

SYMPTOMS

The condition is present at birth and becomes more pronounced with age. The overlying skin is often glossy, tough, thickened or ulcerated. The tumor may be flat, sessile or pedunculated in shape. The child is usually feeble, badly nourished and undeveloped mentally. They are short in stature and, as a rule, their trunk is bent forward. Some form or degree of paralysis is present in most all cases which prevents them from walking in a normal manner. Club feet are frequent and some involvement of the sphincters of the rectum and bladder are present in most all cases. Paralysis and anesthesia are indicative of cord involvement. Those cases in which the cord or any part of it protrudes through the neural arch rarely live to be twenty years of age. The prognosis is best for meningocele.

ADJUSTMENT OF CLEFT VERTEBRAE

Little difficulty is experienced in adjusting these cases when the vertebra to be adjusted is not cleft and this is usually the rule. However, many people have cleft vertebrae in which there is no meningeal protrusion and enjoy fairly good health, yet these cleft vertebrae may become subluxated the same as others so that it will be found necessary to adjust them. In the first place it is necessary to obtain a correct listing on the vertebra which may be done by palpating the transverse processes or by use of the Spinograph. Spinous process palpation is of no value where the posterior neural arch is absent.

If the laminae are well formed and sufficiently heavy, the adjustment may be made upon one of them. That is, if the vertebra be subluxated to the left, the adjustment may be made upon the right lamina and vice versa. However, as a

rule, it is better to make contact and deliver the adjustive move upon the mamillary process because the lumbar vertebra, as a rule, are hard to move and great force used in the adjustment may injure the frail lamina and the sensitive tissue about it.

PROGNOSIS

Results upon conditions due to subluxations of cleft vertebrae can be obtained by adjusting these vertebrae in the manner above described just as well as if they are not cleft. However, due care should be exercised in making the proper contact and in the amount of force used. At no time should speed in the adjustive move be overlooked as by its employment much can be accomplished with but little or moderate force.

In meningocele life may be prolonged and ulceration prevented by adjustments if given in time. The meningocele will, however, persist and the cleft in the spine will not disappear under adjustments. In those cases involving the spinal cord the prognosis is unfavorable, and as previously stated, the period of life in these cases is less than twenty years.

QUESTIONS FOR STUDY

1. State a synonym for spina bifida.
2. To what is spina bifida due?
3. How is spina bifida classified?
4. In what region of the spine does spina bifida most commonly exist?
5. Name three pathological conditions of spinal bifida.
6. Define meningocele. Meningomyelocele. Syringomyelocele.
7. How is meningocele detected?
8. State the symptoms of spina bifida.
9. How are cleft vertebrae detected?
10. How can they be listed for adjustment?

11. What method of adjusting them is preferable?
12. Describe the detail of adjustment.
13. What beneficial effects may result from adjusting cleft vertebrae?
14. What is the prognosis of spina bifida with cord involvement?
15. What principle of adjusting is of utmost importance in adjusting cleft vertebrae?

INDEX

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